06-27-05

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
ON APPEAL BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Patent Application Serial No. 09/993,733	)	Group Art Unit: 1772
Filing Date: November 21, 2001	)	Examiner: Aughenbaugh, Walter
For: Concrete Formworks And Method of Making Same	)	Docket No.: 013190.0101PTUS
	)	Confirmation No.: 9460
Inventor: Gregory D. Johnson	)	

Certificate of Mailing Under 37 CFR 1.10

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June 24, 2005
Date

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MAIL STOP APPEAL BRIEF – PATENTS
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Sir:

APPELLANT'S APPEAL BRIEF

Appellant herewith files his Brief in support of his Appeal in the above-identified matter.

This Appeal Brief is timely filed pursuant to 37 C.F.R. §1.192 because it is filed within two months of April 25, 2005, which is the date on which Appellant filed his Notice of Appeal.

Appellant hereby authorizes the Commissioner to treat any concurrent or future reply, requiring a petition for extension of time under 37 CFR §1.136(a) for its timely submission, as incorporating a petition for extension of the appropriate length of time, and to charge any additional costs for such extension to Deposit Account No. 50-1848.

1.) REAL PARTY IN INTEREST

The real party of interest is the inventor, Gregory D. Johnson. A product covered by the claims is currently being sold by J.M. McCormick Company, an Indiana corporation of which Mr. Johnson owns one-third the stock.

2.) RELATED APPEALS AND INTERFERENCES

None.

3.) STATUS OF CLAIMS

Claims 1 – 12, 14 – 20, 22 – 28, and 39 – 43 are pending on appeal. Claims 13, 21, and 29 – 38 have been canceled. Claims 1 – 12, 14 – 20, 22 – 28, and 39 – 42 stand rejected under 35 U.S.C. 103(a). Claim 43 is objected to as being dependent on a rejected base claim, but is indicated to be allowable if rewritten in independent form.

4.) STATUS OF AMENDMENTS

No amendments have been filed subsequent to the final rejection.

5.) SUMMARY OF THE INVENTION

The invention is a concrete formwork panel 20 (FIG. 1). The term *concrete formwork* is used in the application as it is conventionally used in the concrete art. See page 1, lines 9 and10[1]. That is, the formwork panels 20 are generally made in the form of plates 30, which plates can be assembled into a concrete formworks assembly 90 (FIG. 9) into which wet concrete is poured and allowed to harden. (Page 4, lines 29 – 32, and page 9, line 23 – page 10, line 5.) Like conventional concrete formworks panels, the assemblies of panels 30 can be supported by support frameworks 180. (FIG. 17 and page 11, lines 16 – 21). The basic panel 20 and fasteners 35 (FIG. 3) which are used to connect the panels are shown in FIGS. 1 – 8 of the drawings. FIGS. 10 – 16 show various alternative embodiments of the panels. (Page 3, line 29 – page 4, line 27).

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1 In this Appeal Brief, references to figures, such as FIG. 1, refer to the drawings of the instant application, and references to page and line numbers refer to the specification of the instant application, unless indicated otherwise.

A key aspect of the invention is that sheets 40 from which the panels are formed comprises a three-layered sandwich, the three layers being a high-density polyethylene plastic core layer 41, a steel facing layer 42, and a metal backing layer 44 attached to the plastic core. (Page 5, lines 3 – 8 and lines 17 – 20; page 6, line 2.) One skilled in the art readily recognizes that the term "high" in "high-density polyethylene" is not simply a relative term, but rather "high-density polyethylene" is a particular type of plastic that is inherently different from other plastics, and, in particular, low-density polyethylene. (Page 5, lines 17 – 31.)

The panel according to the invention is thicker than 7 millimeters (mm). (Page 8, lines 7 and 8.) Preferably, the concrete formwork panel ranges from 9 mm to 15 mm thick, and more preferably is 12 mm thick. (Page 8, lines 9 – 11.) The panel has a density such that a panel that is 8 feet (2.43 meters) by 2 feet (0.6 meters) weighs 77 pounds or less. (Page 8, lines 12 – 18.) The weight limitation is important because concrete formwork panels should be such that it can be handled by a single worker, and, if necessary, easily handled by two workers. (Page 8, lines 18 and 19.)

The metal backing layer is preferably made of steel. (Page 6, line 2.) The steel facing layer and the metal backing layer are typically made of 0.009 inch (0.23 mm) steel and may be made of 0.013 inch (0.33 mm) steel or 0.019 inch (0.48 mm) steel. (Page 8, lines 15 – 17.)

Another key aspect of the invention is that the core is a foam plastic with a high percentage of gas in the foam. (Page 5, lines 31 and 32.) The foam can be from 10% to 70% gas by volume, and preferably is 40% or more gas by volume. (Page 5, line 31 – page 6, line 1). Most preferably, the high foam plastic comprises 50% or more gas, by volume. (Page 6, lines 1 and 2). See also page 2, lines 14 – 17.

The concrete formwork panels include flanges 22, 24, 26, and 28 (FIG. 1) having openings 33, which flanges allow the panels to be connected to form a concrete formwork panel assembly 90 (FIG. 9). (Page 4, lines 29 – 32; page 7, lines 1 – 3.) Each flange is formed by bending a panel edge. (FIGS. 4 and 5, and page 8, lines 20 – 22.) The panel is preferably notched at the bend and the bend is 90 degrees to enable the corner to be square. (FIGS. 6 and 7, and page 8, lines 24 – 30.) In one embodiment, the panel 140 is

bent back on itself to form a double thick flange 141. (FIG. 13, and page 10, lines 18 – 25.)

In another embodiment, the concrete formwork panel 150 is bent into a hollow columnar form, which preferably is cylindrical. (FIG. 14, and page 10, line 27 – page 11, line 7.) In a further embodiment 130, the facing 132 of the concrete formwork panel 130 has a recessed or raised portion 135 forming a design to be impressed in concrete. (FIG. 12, and page 10, lines 13 – 17.) The formwork panels also include other conventional elements such as strengthening ribs 21 attached to the metal backing layer 44 and handholds 29. (FIG. 1, and page 6, lines 17 – 32.)

6.) ISSUES

The issues on appeal are:

1. Whether claims 1 – 12, 14 – 17, 22 and 25 – 28[2] are obvious under 35 U.S.C. 103(a) over Sobolev (US 5,030,488) in view of Fitzgerald et al. (US 4,842,241).

2. Whether claims 19, 20, 23, and 24 are patentable because they depend on a patentable claim, namely claim 1.

3. Whether claim 18 is obvious under 35 U.S.C. 103(a) over Sobolev in view of Fitzgerald et al. and further in view of Toedter (US 3,654,053).

4. Whether claims 39 and 41 are obvious under 35 U.S.C. 103(a) over Sobolev.

5. Whether claim 42 is obvious under 35 U.S.C. 103(a) over Sobolev in view of Fitzgerald et al.

6. Whether claim 43 needs to be rewritten as an independent claim.

7.) GROUPING OF CLAIMS

Group I consists of claims 1 – 5, 8, 9, 19, 20, and 23 – 28.

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2 The pertinent Office Action, i.e., the Office Action of August 4, 2004 , in paragraph 7 at the bottom of page 2, also states that claims 39 – 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sobolev in view of Fitzgerald et al. However, claims 39 – 42 are not addressed under this rejection. Instead claims 39 – 41 are addressed only in paragraph 12 on page 11 of the August Office Action in a rejection based solely on Sobolev, while claim 42 is addressed only in paragraph 13 on page 12. These rejections are covered in issues 4 and 5 below. In this brief, we will assume that the inclusion of claims 39 – 42 in the rejection of paragraph 7 of the August Office Action was inadvertent.

Group II consists of claim 6. This claim is separately patentable from the claims of the other groups because the claimed panel thickness is far outside the range disclosed or suggested in the cited references.

Group III consists of claim 7. This claim is separately patentable from the claims of the other groups because the claimed metal layer thickness is not disclosed or suggested in any cited reference.

Group IV consists of claim 10. This claim is separately patentable from the claims of the other groups because the cited references do not teach a concrete formwork panel made of a metal/foamed high-density polyethylene sandwich.

Group V consists of claim 11. This claim is separately patentable from the claims of the other groups because the cited references do not teach a concrete formwork panel made of a metal/foamed high-density polyethylene sandwich in which the volume of gas in the foam is 40% or more, and because this high of gas volume is taught against by the cited references.

Group VI consists of claim 12. This claim is separately patentable from the claims of the other groups because the cited references do not teach a concrete formwork panel made of a metal/foamed high-density polyethylene sandwich, and the claimed volume of gas in the foam is almost double the highest foam volume disclosed in the cited references and, in fact, is taught against by the cited references.

Group VII consists of claims 14 – 17. These claims are separately patentable from the claims of the other groups because the cited references do not disclose or suggest bending a concrete formwork panel to form a flange.

Group VIII consists of claim 22. This claim is separately patentable from the claims of the other groups because none of the cited references teach or suggest a concrete formwork panel wherein the panel facing has a recessed or raised portion forming a design to be impressed in the concrete.

Group IX consists of claim 18. This claim is separately patentable from the claims of the other groups because the cited references do not disclose a concrete formwork panel, or any other panel, that is bent back on itself to form a double-thick flange.

Group X consists of claim 39. This claim is separately patentable from the claims of the other groups because the cited reference does not disclose a concrete formwork panel with a foam plastic core in which the foam plastic is 32% or more gas by volume, and, in fact, the cited reference teaches against this high of gas volume.

Group XI consists of claim 40. This claim is separately patentable from the claims of the other groups because the claimed foam gas volume of 40% or more gas by volume is far higher than the highest useful foam volume taught in the cited reference, and, in fact, the cited reference teaches against this high value of gas volume.

Group XII consists of claim 41. This claim is separately patentable from the claims of the other groups because the claimed foam gas volume of 50% or more gas by volume is almost double the highest useful foam volume taught in the cited reference, and, in fact, the cited reference teaches against this high value of gas volume.

Group XIII consists of claim 42. This claim is separately patentable from the claims of the other groups because the cited references do not teach using high-density polyethylene in a concrete formwork panel, or any panel, and, in particular, foamed high-density polyethylene.

Group XIV consists of claim 43. This claim is separately patentable from the claims of the other groups because it has been indicated to be allowable by the Examiner if rewritten in independent form.

8.) ARGUMENT

I. INTRODUCTION

As defined in 37 CFR 1.192, subparagraphs 8(ii), 8(iii) and 8(v) are not relevant to the instant appeal and are therefore omitted. In the argument, we refer to the Office Action of August 4, 2004 (hereinafter "the August Office Action") and the Office Action of January 26, 2005 (hereinafter, "the January Office Action"). All the substantive rejections were made in the August Office Action, which rejections were simply incorporated by reference in the January Office Action. The January Office Action adds arguments responsive to declarations and arguments presented in the response to the August Office Action filed November 4, 2004, but makes no additional substantive rejections.

II. THE CITED PRIOR ART

A. United States Patent No. 5,030,488 Issued To Igor Sobolev

Sobolev discloses a freight container panel comprising a sandwich of two metal sheets 31 and 37 with a polymer resin core 36. (Abstract; FIG. 3B; col. 3, line 65 – col. 4, line 57; col. 6, lines 9 – 12; col. 7, lines 10 – 18.) The disclosure metal sheets can be aluminum, steel, nickel, copper, titanium, magnesium, zinc, and the like as well as various alloys thereof. (Col. 9, lines 27 – 30). However, aluminum is indicated to be the preferred metal. (Col. 19, the line just above Table II). Of the 81 examples given in the application, aluminum was used in 80 and steel in one. The one steel example was inferior to the comparable examples for aluminum. The steel panel tested is about 5% heavier than the comparable aluminum panel, but deflects about 20% more and is 30% worse with respect to impact resistance. (Cols. 19 and 20, Table II; col. 13, lines 42 – 56.) Sobolev also discloses that the panel can be used for concrete pouring forms, but this in di minimus; in 38 columns of specification, the only mention of the concrete pouring form application is in col. 3, line 60, and is at the end of a litany of possible uses. The entirety of the rest of the disclosure of Sobolev is focused on freight trailers. Sobolev discloses that unsaturated polyesters and vinyl esters are suitable polymer resins useful for making the laminate, and mentions epoxies, polyester-polyurethane hybrids, and polyurethanes as additional resin types investigated. (Col. 26, lines 16 – 28.) No disclosure or suggestion of high-density polyethylene or even polyethylene is made in Sobolev.

Sobolev also discloses the use of microballoons and blowing agents in the resin core. Core density reductions of up to 34% are obtained with microballoons. This can be determined from Tables IVa and IVb which span columns 23 and 24 and continue to columns 25 and 26. From Table IVa, the core specific gravity with no low-density additive is 1.223. The lowest core specific gravity is 0.813 for sample IV-12. By subtracting the lowest core specific gravity from the no-additive specific gravity and dividing by the no-additive specific gravity, the percent reduction can be obtained. The additive for sample IV-12 is EX 461 DE, which, from Table IVb, is an expanded copolymer microsphere, which is a type of microballoon. (To see that this is a microsphere, continue reading the table on

the top of columns 25 and 26). Two blowing agents were also used, namely, Celogen XP 100 and Luperfoam 329. See the bottom of Table IVb. The highest gas volume disclosed in Sobolev for a foamed plastic is 26.7%, which we will round to 27%. Sobolev discloses that blowing agents were less effective in retaining impact resistance as core density is reduced, and the production process is also more difficult to control. (Col. 22, line 67 – col. 23, line 8.) This is born out in the data provided in Table IVa. Sample IV-17 uses a foamed plastic with a core density reduction (gas volume) of 26%, which can be determined by subtracting the specific gravity of the sample (.905) from the specific gravity of sample IV-1 (1.223) which has no foam, and dividing by 1.223. Even at 26% gas volume, the impact resistance rating (4) is less than average. Sample IV-18 is also a foamed plastic panel, but with a gas volume of 27%. The impact resistance rating has dropped to 3. Thus, even for densities as low as 27%, the panel is becoming problematic. Sobolev states that "in a number of cases, core density reductions of 30% were readily achieved without the loss of important laminate properties." (Col. 22, lines 13 – 15.) However, from Tables IVa and IVb, this is clearly for microballoons.

B. United States Patent No. 4,842,241 Issued To John M. Fitzgerald et al.

Fitzgerald discloses a plastic mold for forming concrete test specimens. (Col. 1, lines 6 and 7, col. 3, lines 4 and 5.) High-density polyethylene is disclosed as a suitable plastic. (Col. 3, lines 13 – 15.)

C. United States Patent No. 3,654,053 Issued To W.C. Toedter

Toedter discloses a decorative panel which is notched at a bend and folded back on itself to form a panel that has a finished appearance. (FIGS. 4 – 12, and col. 7, lines 47 – 52.)

III. THE DECLARATIONS FILED IN THIS APPLICATION

Five declarations were filed in this application. Each of these will be briefly discussed below to place them in context. However, so as not to unduly lengthen the brief,

particular facts in the declarations will be discussed only in the argument below in connection with the legal points which they support.

The Declaration of Gregory D. Johnson (hereinafter, the "Johnson Dec."), the inventor, was provided in response to the first Office Action. Gregory Johnson is a partner in J.M. McCormick Company, a distributor of lumber and other building materials, including laminated panels. He had eighteen years of experience in the field of the invention at the time of his declaration. (Johnson Dec., ¶1.) This Declaration was dismissed by the Examiner on the grounds that it was a declaration by the inventor. Thus, it was replaced by a Declaration of Edward Rahe (hereinafter, the "Rahe Dec.").

Edward Rahe was Vice-President of Engineering for Symons Corporation, the leading supplier of concrete formwork systems in the United States. He was a Professional Engineer and had 38 years of experience in the concrete formworks field at the time of his declaration. It was his job at Symons to test concrete formwork panels for consideration for sale by the company or to provide information on competition. (Rahe Dec., ¶¶1 and 9.) It is unlikely that there was anyone else in the United States better positioned to provide an opinion on the unexpectedly improved properties of a concrete formwork panel.

The Declaration of Carl A. Forest (hereinafter, the "Forest Dec.") was provided after the Examiner dismissed the Rahe Declaration because the panel as claimed was not compared "to the closest prior art commensurate in scope to the claims" to authenticate additional evidence provided by Mr. Rahe that compared the inventive panel to the ten best concrete formwork panels Mr. Rahe had tested in the prior three years, including the best metal/laminate panel available. Mr. Forest is the attorney who wrote and is prosecuting this application. He presented the data rather than Mr. Rahe because of a deadline to submit a response while Mr. Rahe was on vacation. This data was later authenticated in a Supplemental Declaration of Edward Rahe (hereinafter, the "Rahe Supp. Dec.").

The Second Declaration of Gregory D. Johnson (hereinafter, the "2nd Johnson Dec.") was provided in response to new rejections of the Examiner to provide additional factual information related to the success of his panel, the reasons for the differences in testing panels in the trucking and concrete formwork industry, and the reasons why resistance to deflection is such an important property for a concrete formwork panel.

The Second Declaration of Carl A. Forest (hereinafter, the "2nd Forest Dec.") was provided in response to the dismissal of the Supplemental Declaration of Mr. Rahe by the Examiner because it did not provide a comparison to the alleged "closest prior art" to provide information to the USTPO regarding the metal/plastic laminate panel used to make the key comparison in the Supplemental Declaration of Mr. Rahe and to report on Mr. Forest's search for a Sobolev panel, in order to try to provide a comparison as required by the Examiner.

The Second Declarations were provided by Mr. Johnson and Mr. Forest rather than Mr. Rahe because Mr. Rahe had a reoccurrence of stomach cancer. (2nd Forest Dec., ¶13.)

Copies of the Rahe Dec., the Rahe Supp. Dec., the 2nd Johnson Dec., and the 2nd Forest Dec. are attached hereto as Exhibits A through D so the Board will not have to search for these through the voluminous file.

IV. THE REJECTION OF THE CLAIMS OF GROUP 1

A. The Examiner's Rejection Of Claim 1 Under 35 U.S.C. §103 Under 35 U.S.C. §103(A) Over Sobolev In View Of Fitzgerald Does Not Meet The Legal Standard Required For A Prima Facie Case Of Obviousness Under §103 Because There Is No Suggestion Or Motivation Within The References Themselves Or In Knowledge Readily Available To Those Skilled In The Art To Combine The References.

The MPEP states:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be found in the prior art, and not based on applicants' disclosure.

MPEP §2142. See also *In re Vaeck*, 20 USPQ2d 1438, 1432 (Fed. Cir. 1991), which the MPEP cites in support of this law.

Claim 1 recites:

A concrete formwork panel comprising:

a high-density polyethylene plastic core;

a steel facing layer attached to said plastic core;

a metal backing layer attached to said plastic core;

said panel being thicker than 7 millimeters (mm).

Fitzgerald discloses a concrete mold made of a single material. Sobolev discloses a metal/resin/metal laminate panel for use in freight containers such as truck bodies. The entire 38 columns of specification of Sobolev, except for one sentence, entirely relates to such freight containers. That one sentence recites a long list of "other uses", and only at the very end of the list does it mention concrete formwork. The only possible reason for connecting Sobolev and Fitzgerald is this one use of the word *concrete* in Sobolev. The Examiner would have us believe that someone skilled in the art would find that one use of the word *concrete* in a long reference relating to laminated truck panels and then recognize that if he used the material from which the single material mold in Fitzgerald was made from in the truck body panel, the result would be a superior concrete formworks panel. This could never happen in reality.

Those skilled in the concrete art recognize that a concrete mold is a different product than a concrete formwork panel. (Rahe Supp. Dec., ¶¶17 – 20.) Molds are throw-away products, generally intended for one-time use. Fitzgerald supports this in that throughout the specification the molds are referred to as useful for forming *concrete test specimens*. (Col. 1, lines 6 and 7, for example.) Concrete formwork panels are intended to be assembled, used, disassembled, and reused for years and thus have to take a lot of abuse. (Rahe Supp. Dec., ¶¶17 – 20.) For this reason alone, one skilled in the art would not combine the two references.

Further, Fitzgerald is not about what kinds of plastics can be used for concrete molds. The entire disclosure is about a particular structure for a concrete mold. The entire disclosure of Fitzgerald regarding high-density polyethylene is as follows:

> Although not intended to limit the disclosure to any one particular plastic, one example of a suitable plastic is high-density polyethylene. (Col. 3, lines 13 – 15.)

Thus, the disclosure does not single out high-density polyethylene as having any particular advantages over other plastics for a mold, much less a laminated panel. It specifically does not teach anything about high-density polyethylene that would make it particularly useful in a steel/plastic laminate, such as how it would laminate with steel and how the laminate would stand up to abuse. (Rahe Supp. Dec., ¶21.) Sobolev mentions five different types of polymer resins that may be useful for forming the panel, but does not mention high-density polyethylene or polyethylene of any type, or anything else that would suggest that high-density polyethylene might be a suitable plastic to include in its laminate. Thus, there is nothing in the two disclosures that would suggest to one skilled in the art that a plastic mentioned only briefly in Fitzgerald, in a way that did not suggest any properties that made it different from other plastics, should be combined with the panel of Sobolev.

Finally, those skilled in the art know that plastics are not all equivalent. Finding the right plastic for a particular application is a sophisticated process. Most people, and certainly those skilled in the art, know that high-density polyethylene is the substance from which plastic milk jugs are formed, while the polymer resins of Sobolev are similar to plastic adhesives, such as superglue. The materials are sufficiently different that knowledge generally available to those skilled in the art would tend to point away from the substitution of one for the other, rather than the other way around.

B. The Office Actions Do Not Establish A Prima Facie Case Of Obviousness Of Claims 1 – 12, 14 – 17, 22, And 25 – 28 Under 35 U.S.C. §103(a) Because The Cited Art Teaches Against The Combination And Motivation For Combination Comes From The Instant Application, Not The References Themselves.

The Examiner states that guidance provided by the reference for the combination in claim 1 is that Fitzgerald shows that high-density polyethylene is rigid enough to make a concrete mold. However, Fitzgerald only says that any plastic panel of "sufficient thickness to have the required rigidity for use in forming a concrete test specimen" will do. (Col. 3,

lines 11 – 13.) This covers hundreds if not thousands of plastics and gives no guidance with respect to which would be the best to select to make a laminated panel.

One skilled in the art of concrete formwork panels would understand that the properties of importance for a panel is that a suitably sized panel would be of a weight that could be handled by either one or two humans (see page 8, lines 17 – 19), and that it deflects minimally under the pressure of pouring concrete. (Rahe Dec., ¶10.) Deflection is critical because it determines how fast one can pour the concrete. That is, when concrete is poured into a form, the amount of deflection is proportional to how fast the concrete enters the form. Thus, a 10% lower deflection allows one to pour the concrete about 10% faster, a 25% lower deflection allows the concrete to be poured about 25% faster, and a 30% lower deflection allows the concrete to be poured about 30% faster, etc. Time is money in the concrete industry, and the savings in time as a result of lower deflection in a panel that meets the weight constraints flows money directly to the bottom line. Thus, significantly less deflection means significantly more profits. (2nd Dec. of Johnson, ¶¶s 16 – 19.) Even a 10% better deflection is significant in the concrete industry. (Supp. Dec. of Rahe, ¶10.) However, the only steel laminate panel tested in Sobolev deflected 20% more than the comparable aluminum laminate panel, even though the steel panel was 5% heavier. (Table II spanning columns 19 and 20 in Sobolev and 2nd Dec. of Forest, ¶15.) The steel laminate also was 30% worse than the aluminum panel with regard to impact resistance. (Sobolev, ibid, and 2nd Dec. of Forest, ¶16.) Thus, Sobolev teaches against the combination of the high-density polyethylene with steel. That is, if, despite the fact Fitzgerald relates to a mold made out of a single material and Sobolev relates to laminate panels, one skilled in the art were to make the combination of the plastic of Fitzgerald with the panel of Sobolev, the person would choose to make the combination with an aluminum laminate. However, the Examiner chose the steel laminate. Only the instant application could give this guidance, so it is clear that the suggestion for the combination made by the Examiner came from the present application, not the cited references.

C. The Office Actions Do Not Establish A Prima Facie Case Of Obviousness Of Claims 1 – 12, 14 – 17, 22, And 25 – 28 Under 35 U.S.C. §103(a) Because The

References Provide No Reasonable Expectation Of Success If The Combination Is Made.

As indicated above, the MPEP and the case law require not only that the combination be suggested by the references, but the disclosures of the reference provide a reasonable expectation of success. There is not a single word in either Sobolev or Fitzgerald that indicates that the combination of the polyethylene material of Fitzgerald with the steel panel of Sobolev will provide a superior panel of any kind, much less a superior concrete formworks panel. Throughout six Office Actions, the Examiner has not pointed to a single word in either reference that indicates that the combination will be successful.

D. At Most, The Office Action Rejection Makes A Case Of Obvious To Try, Which Is Not Proper Grounds For A 35 U.S.C. §103(a) Rejection.

A patent examiner must consider the whole of the teachings of the reference and not ignore the portion of a reference that teaches against the combination according to the invention. MPEP 2142.02, last section; and *W.L. Gore & Associates, Inc. v. Garlock*, 220 U.S.P.Q. 303 (Fed. Cir. 1983). If the whole of Sobolev is considered, there are seven metals and five classes of plastics that must be considered as possible candidates for a panel. The only direction given in Sobolev to select between the metals is that aluminum is preferred, but that goes against the claimed subject matter. If the whole of Fitzgerald is considered, any plastic that is of "sufficient thickness to have the required rigidity for use in forming a concrete test specimen" must be considered.

In re O'Farrell states:

> The admonition that "obvious to try" is not the standard under §103 has been directed mainly at two kinds of error. In some cases, what would have been "obvious to try" would have been to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful.

In re O'Farrell, 853 F.2d 894, 903, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988). The cases cited in *O'Farrell* indicate a wide range of the number of choices that cause a case to fall into the "obvious to try: category. *In re Geiger*, 815 F. 2d 686, 688, 2 USPQ2d, 1276, 1278

(Fed. Cir. 1987) (approximately ten different combinations of three known scale and corrosion prevention agents); *Novo Industri A/S v. Travenol Laboratories, Inc.*, 677 F.2d 1202, 1208, 215 USPQ 412, 417 (7th Cir. 1982) (thousands of fungal species); *In re Yates*, 663 F. 2d 1054,1057, 211 USPQ 1149, 1151 (CCPA 1981) (varying the degree of one parameter, i.e., the degree of conversion); *In re Antonie*, 559 F.2d 618, 621, 195 USPQ 6, 8-9 (CAPA 1977) (varying three parameters, e.g., tank volume, efficiency, and contactor area). Here, if all the possible combinations are to be tested, thousands of different panels would have to be made.

E. Any Prima Facie Case Of Obviousness Of Claim 1 Is Rebutted By The Unexpectedly Improved Properties Of The Claimed Panel.

As indicated in the above paragraphs, Applicant strongly believes that no prima facie case has been made by the Examiner. However, if for some reason the Board believes that a prima facie case has been made out, then Applicant may rebut such a prima facie case with evidence. MPEP §2144.08, *In re Soni*, 54 F.3d 746,750, 34USPQ2d 1684, 1687 (Fed. Cir. 1995); *In re Piasecki,* 745 F.2d 1468, 1474, 223 USPQ 785, 789-90 (Fed. Cir. 1984). The rebuttal evidence may include evidence that the claimed invention yields unexpectedly improved properties or properties not present in the prior art. MPEP, *supra*, and *In re Papesch*, 137 USPQ 43, 48 (CAPA 1963).

Applicant provided objective evidence that the instant application is superior to all other concrete formwork panels. A key portion of the evidence submitted was quantitative, giving specific comparative measurements vis a vis the most common formwork panel in use today, the high-density overly (HDO) panel, in the most important characteristic for concrete formwork panels, i.e., deflection under pressure. (Rahe Dec., ¶10, and Exhibit B attached thereto. A *⅜-inch* panel as claimed performed 20% better than a new *½-inch* HDO panel and 43% better than a used *½-inch* HDO panel. Applicant also provided qualitative evidence in the form of statements of the Vice-President of Engineering for Symons Corporation, the leading manufacturer of concrete formworks and shoring in the United States. (Rahe Dec., ¶1.) Mr. Rahe stated in a declaration that the panel as claimed in claim 1 was the best concrete formwork he had ever found, that he found that this was

surprising considering the thinness and light weight of the panel, that the panel was over 85% plastic, and the plastic was more than 30% gas. (Rahe Dec., ¶¶8, 9, and 11.) Mr. Rahe also gave qualitative reasons for the superiority of the claimed panel, in that it was more durable than wood or aluminum panels and provides a good finish to the concrete. (Rahe Dec., ¶¶12 – 14.)

The Examiner rejected the Rahe declaration because the panel was not compared "to the closest prior art commensurate in scope to the claims". Mr. Rahe then provided a second declaration in which he made objective quantitative comparisons to the best ten panels he had tested in the prior three years, including the best metal/plastic laminate panel he had ever tested. The claimed panel turned out to be 25% better in the deflection test to the best metal/plastic laminate panel available. (Rahe Supp. Dec., ¶¶s 8 – 15.) Mr. Rahe stated that he found the result "shocking" because he had tested panels for years and the results for the claimed panel were well below what he expected. (Rahe Supp. Dec., ¶16.) Mr. Rahe states that all other metal/plastic laminate panels he had ever tested were two to three times worse in the deflection test, and if there were another metal/plastic laminate concrete formwork panel available he would have seen it, because that is the nature of his job. (Rahe Supp Dec., ¶10.) The declarations provided also provide the reason why the deflection test is the most important test for concrete, i.e., it determines how fast the concrete can be poured, and pouring time is critical to the bottom line in the concrete business, and why even a 10% improvement is significant. (2nd Johnson Dec., ¶¶16 – 19, and Rahe Supp Dec., ¶14.)

The Examiner again rejected the Rahe declaration on the basis that the German ½-inch panel was not the "closest prior art commensurate in scope with the claims", citing MPEP 716.02(b). The Examiner interprets this section of the MPEP to require that the closest prior art be "the panel obtained from the (examiner's) proposed modification of the Sobolev panel as made of record in the 35 U.S.C. 103 rejection of claims 1 – 12, 14 – 17, 22, 25 – 28, and 39 – 42. If this is not attainable, the panel taught by Sobolev would be the closest prior art." However, both the courts and the MPEP have rejected the Examiner's interpretation of the prior art. The CCPA has held that the first prior art proposed by the Examiner, i.e., the modification of Sobolev to contain the high-density polyethylene of

Fitzgerald "would amount to requiring comparison of the results of the invention with itself". *In re Chapman and Cosby,* 357 F.2d. 418, 222; 148 USPQ 711, 714 (CCPA 1966). See also MPEP 716.02(g)III. The second prior art comparison proposed by the Examiner, a comparison with Sobolev, is not possible because a panel according to Sobolev does not exist. A direct comparison with the Sobolev reference is not possible because the deflection tests disclosed in Sobolev are trucking panel industry tests, in which a panel is held at two ends and a weight is suspended in the middle. This test is relevant to the trucking industry because it reveals how mush a panel will deflect if, for example, a person or a box leans against it. (2nd Johnson Dec., ¶13.) The only tests available to Applicant were tests relevant to the concrete industry, which are different than the tests relevant to the trucking industry. The tests relevant to the concrete industry are tests that measure the deflection of the panel when a certain pressure is exerted across the entire panel, which is how concrete interacts with the panel. (2nd Johnson Dec., ¶14.) Thus, the results of the tests disclosed in Sobolev are not directly comparable with the concrete industry tests available to Applicant. (2nd Johnson Dec., ¶15.) Applicant's attorney searched in the best libraries available to him and on the Internet to try to find a panel according to Sobolev, but could not find one. It appears that such panels do not exist. (2nd Forest Dec., ¶¶21 – 23.) The law does not require a comparison with prior art that does not exist. *In re Geiger*, 815 F.2d 686, 689, 2 USPQ2d 1276, 1279 (Fed. Cir. 1987)(Newman, J., concurring) and MPEP 716.02(e)III.

As indicated above, the Examiner cites MPEP 716.02(b) as the basis for his position that Applicant is obligated to compare the results of the claimed invention "with the closest prior art which is commensurate with the scope of the claims", and, in particular, the art that the Examiner interprets that phrase to require. MPEP 716.02(b) does not state what the closest prior art should be. It only states that "Evidence of unexpected properties may be in the form of a direct or indirect comparison with the closest prior art which is commensurate in scope with the claims," citing *In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980); *In re: Blondel*, 499 F.2d 1311, 1317 182 USPQ 294, 298 (CCPA1974); and *In re Fouch*, 439 F.2c 1237, 1241-42, 169 USPQ 429, 433 (CCPA 1971). However *Boesch* does not state that the prior art must be commensurate with the scope of the

claims, but that the comparison test data must be commensurate in scope with the claims. *Boesch*, supra, page 220 at headnote 3. *Blondel* and *Fouch* also provide no support for the position that the prior art comparison must be with the cited art commensurate with the scope of the claims, but only that the test data showing the improvement must be commensurate with the scope of the claims. MPEP 716.02(b) also makes reference to MPEP 716.02 (d) and (e), but review of those sections and the case law cited in them also turns out to support Applicant's position as summarized above. If the cases are read carefully, the requirement that the comparison be with the "closest prior art commensurate with the scope of the claims" is a requirement that applies to claims that include a range. Here, claims 1 and 39 do not contain a range, so this phrase has been misapplied by the Examiner.

The actual requirement of the law for comparisons to rebut a prima facie case of obviousness is that apparatus with the unexpected results (not the prior art) be commensurate with the scope of the claims. (*Boesch*, supra, and MPEP 716.02(d)), and that the test be one that reasonably leads to the conclusion that the results are unexpected and sufficient to support a legal conclusion of unobviousness. *In re Geiger*, supra, at 1279. Here, the tested panels, i.e., the Johnson or McCormick panels, were completely commensurate with the claims. (Rahe Dec., ¶¶2 and 9.) The tests were made against all metal/plastic laminate panels available to Edward Rahe, the Vice-President of Engineering of the leading manufacturer of concrete formworks in the US, and the primary comparison was with the best metal/plastic laminate panel ever tested by Mr. Rahe. (Rahe Supp. Dec., ¶¶8 – 11.) This was the most reasonable comparison available to Applicant.

While it may have been of scientific interest to be able to find a Sobolev panel and compare it to the panel according to the invention, as a matter of law this is not required. *In re Geiger*, supra, at 1279. Applicant provided the best data available. It is also noted that the data provided was data taken in tests performed in the routine course of business of Symons Corporation. Such data is inherently more trustworthy than data from a test specifically designed to show unexpected results to obtain allowance of a patent application.

Finally, it is noted that the Examiner has not presented an iota of evidence that it would be *expected* in the art that the Johnson or McCormick panels should be superior. The Federal Circuit Court of Appeals recently stated:

> Mere improvement in properties does not always suffice to show unexpected results. In our view, however, when an applicant demonstrates *substantially* improved results, as Soni did here, and *states* that the results were *unexpected*, this should suffice to establish unexpected results *in the absence of* evidence to the contrary. (Emphasis by the Court).

In re Soni, 54 F.3d 746,750, 34USPQ2d 1684, 1688 (Fed.Cir. 1995) at headnote 2.

F. The Other Claims Of Group I, Namely Claims 2 – 5, 8, 9, 19, 20, And 23 – 28 Are Patentable Because They Depend On Claim 1 Which Is Patentable.

Claims 2 – 5, 8, 9, 19, 20, and 23 – 28 are patentable because they all depend on claim 1, which is patentable for the reasons given above. *In re Fine*, 5 USPQ 2d 1596, 1600 (Fed. Cir. 1988) at headnote 4.

V. THE REJECTION OF THE EXAMINER TO THE CLAIM OF GROUP II

The Examiner's Rejection Of Claim 6 Under 35 U.S.C. §103 Under 35 U.S.C. §103(a) Over Sobolev In View Of Fitzgerald Fails For All The Reasons Given In Section IV Above, And Also Because Claim 6 Contains A Limitation That Is Not Disclosed In Any Of The Cited References.

Claim 6 depends on claim 1 and contains all its limitations, and therefore is patentable at least for that reason. *In re Fine*, 5 USPQ 2d 1596, 1600 (Fed. Cir. 1988) at headnote 4. In addition, claim 6 contains the limitation that one of the facing layers is made of .009 inch (0.23mm) steel. The patent law requires that the prior art reference (or references when combined) must teach or suggest all of the claim limitations. Fitzgerald does not teach anything about a metal backing but relates only to a mold made of plastic. Sobolev teaches a metal backing thickness .015 inch and 0.1 inch, which the Examiner readily admits. The Examiner says the .009 thickness merely amounts to finding an optimum value, and it has been held that finding an optimum value of a result is an effective variable, and cited *In re Boesch* in support of this position. However, *Boesch* states that "Each of the ranges of constituents in appellants claimed alloys overlaps ranges

disclosed by Pohlman et al. and Lamb." *Boesch*, supra, page 218. That is not true in this case. The more appropriate patent law is that, with respect to obviousness rejections under 35 U.S.C. 103, the particular limitations rejected must be shown in a reference. See, for example, *In re Glass*, 176 USPQ 489, 491 (CCPA 1973) at headnote 1. The thickness claimed is 40% less than the minimum thickness disclosed in the references, and there is no case law indicating that such a large difference is merely an obvious variation.

VI. THE REJECTION OF THE EXAMINER TO THE CLAIM OF GROUP III

The Examiner's Rejection Of Claim 7 Under 35 U.S.C. §103 Under 35 U.S.C. §103(a) Over Sobolev In View Of Fitzgerald Fails For All The Reasons Given In Section IV Above, And Also Because Claim 7 Contains A Limitation That Is Not Disclosed In Any Of The Cited References.

The law cited in Section V above is applicable here also, because the .013 inches (0.33mm) thickness claimed in claim 7 is also below the minimum thickness disclosed in Sobolev. In particular, the only thickness for a steel facing disclosed in Sobolev is 0.018 inches. See Sample II-1 in Table II spanning columns 19 and 20. The recited thickness is about 25% less than the thickness disclosed in Sobolev. Since the steel panel with the 0.018 inch thick metal disclosed in Sobolev is inferior in performance to the preferred aluminum panels disclosed in Sobolev, why would someone skilled in the art make a steel/high-density polyethylene panel in which the steel is even thinker? (2nd Forest Dec., ¶¶15 and 16.) This does not make sense. Thus, claim 7 is not obvious over Sobolev in view of Fitzgerald.

VII. THE REJECTION OF THE EXAMINER TO THE CLAIM OF GROUP IV

The Examiner's Rejection Of Claim 10 Under 35 U.S.C. §103 Under 35 U.S.C. §103(a) Over Sobolev In View Of Fitzgerald Fails For All The Reasons Given In Section IV Above, And Also Because There Is No Suggestion In Any Of The References That High-Density Polyethylene Can Be Usefully Foamed.

Claim 10 depends on claim 1 and contains all its limitations, and therefore is patentable at least for that reason. *In re Fine*, 5 USPQ 2d 1596, 1600 (Fed. Cir. 1988) at headnote 4. Claim 10 recites the additional limitation that the high-density polyethylene

plastic of claim 1 is foam plastic. There is nothing in either Sobolev or Fitzgerald to indicate that high-density polyethylene can be foamed and still make a useful panel. Sobolev indicates that foaming the resins disclosed in Sobolev is difficult and less effective. See col. 22, line 67, through col. 23, line 8. With such a disclosure in Sobolev, it is completely unexpected that the foamed polyethylene/steel panels claimed in claim 10 produce such superior results as shown in the declarations. Thus, even if a prima facie case for obviousness is made out for this claim, it is rebutted by the evidence of unexpected results that apply to this claim.

VIII. THE REJECTION OF THE EXAMINER TO THE CLAIM OF GROUP V

The Examiner's Rejection Of Claim 12 Under 35 U.S.C. §103 Under 35 U.S.C. §103(a) Over Sobolev In View Of Fitzgerald Fails For All The Reasons Given In Section VII Above, And Also Because The Volume Of Gas Disclosed In Claim 11 Is Not Disclosed In The References, And, In Fact, Is Taught Against In The Cited References.

Claim 11 depends on claim 10 and contains all its limitations, and therefore is patentable at least for that reason. *In re Fine*, 5 USPQ 2d 1596, 1600 (Fed. Cir. 1988) at headnote 4. In addition, claim 11 recites the limitation that the polyethylene foam contains 40% or more gas by volume. There is no disclosure of any foam gas density as high as 40% in either of the references. The highest gas density for foamed plastic disclosed in Sobolev is about 27%. Forty percent gas density is nearly 50% higher than this. Moreover, Sobolev discloses that high gas volumes of the range that were obtained for microballoons were problematic for foamed plastic. See col. 22, line 67 – col. 23, line 8. Even for microballoons, gas volumes higher than 30% were problematic. See col. 22, lines 13 – 15. If core densities of 40% are not mentioned in the references, they cannot be obvious. *In re Glass*, supra. Further, if core density reductions in the 26% – 27% range for foamed cores are problematic as discussed above, it certainly is not obvious to make larger core density reductions. *In re Fine*, supra, 1599, near bottom of first column. Also see *W.L. Gore & associates v. Garlock, Inc.,* 721 F.2d 1540, 1550, 220 USPQ 303, 311 which is cited in *Fine*. Moreover, the MPEP specifically adapts the position of *Fine* and *Gore* on this issue. See MPEP 2141.02, last section.

IX. THE REJECTION OF THE EXAMINER TO THE CLAIM OF GROUP VI

The Examiner's Rejection Of Claim 12 Under 35 U.S.C. §103 Under 35 U.S.C. §103(a) Over Sobolev In View Of Fitzgerald Fails For All The Reasons Given In Section VIII Above, And Also Because The Volume Of Gas Disclosed In Claim 12 Is Double The Highest Gas Volume For Foamed Plastic Disclosed In The Cited References, And Gas Volumes Far Smaller Are Disclosed As Being Problematic.

Claim 12 depends on claim 11 and contains all its limitations, and therefore is patentable at least for that reason. *In re Fine*, 5 USPQ 2d 1596, 1600 (Fed. Cir. 1988) at headnote 4. In addition, claim 12 recites the limitation that the polyethylene foam contains 50% or more gas by volume. As indicated above, the highest gas density for foamed plastic disclosed in Sobolev is about 27%, and even this is problematic. There is no disclosure of any foam gas density as high as 50% in either of the references. If gas volumes of 50% are not mentioned in the references, they cannot be obvious. *In re Glass*, supra. Further, if core density reductions of 27% for foam are problematic, and core density reductions of 30% are problematic for important laminate properties, even for microballoons, it certainly is not obvious to make 50% core density reductions.

X. THE REJECTION OF THE EXAMINER TO THE CLAIMS OF GROUP VII

The Examiner's Rejection Of Claim 14 – 17 Under 35 U.S.C. §103 Under 35 U.S.C. §103(a) Over Sobolev In View Of Fitzgerald Fails For All The Reasons Given In Section IV Above, And Also Because Neither Of The References Disclose A Flange Formed By Bending The End Of A Panel.

Claims 14 – 17 depend on claim 1 and include all its limitations; therefore, these claims are patentable for all the reasons given in Section IV above in connection to claim 1.

Claim 14 recites a flange made by bending the end of the panel. The Examiner admits that Sobolev does not show a flange, but cites Fitzgerald to obviate the flange. However, the portions of Fitzgerald that the Examiner points to and interprets as flanges are the sidewalls 12 and 14 (FIG. 1). Fitzgerald does have flanges 70 and 72 (FIG. 1), but these are formed by attaching a separate metal strip to the sidewall. Those skilled in the art would not interpret a sidewall as a flange. *The American Heritage Dictionary, New College Edition*, 1980 Houghton Mifflin Company, Boston, page 499 (copy attached hereto as Exhibit E), defines *flange* as "A protruding rim, edge, rib or collar ... used to strengthen

an object, hold it in place, or attach it to another object". This definition is completely consistent with Applicant's use of the term, but inconsistent with the Examiner's. More importantly, one skilled in the art would not look at Fitzgerald and think of Applicant's claimed flange, because Fitzgerald teaches a different form for a flange, and Applicant's claimed flange would not work in Fitzgerald because the walls are too thick. Clearly, the Examiner is using the hindsight of Applicant's disclosure to modify Sobolev, not Fitzgerald. This hindsight is not proper. MPEP §2142 and *In re Vaeck*, 20 USPQ2d 1438, 1432 (Fed. Cir. 1991).

XI. THE REJECTION OF THE EXAMINER TO THE CLAIM OF GROUP VIII

The Examiner's Rejection Of Claim 22 Under 35 U.S.C. §103 Under 35 U.S.C. §103(a) Over Sobolev In View Of Fitzgerald Fails For All The Reasons Given In Section IV Above, And Also Because Neither Of The References Disclose A Concrete Formwork Panel Having Metal Facing Which Is Recessed Or Raised To Form An Impressed Design In Concrete.

Claim 22 depends on claim 1 and includes all its limitations; therefore, this claim is patentable for all the reasons given in Section IV above in connection to claim 1.

To find the facing that is recessed or raised to form a design in Sobolev, the Examiner points to the contour at the bottom left-hand corner of FIG. 8A. This contour is merely an artifact of the drawing, not something real. The panel 87 shown in FIG. 8A is truncated, because the actual panel is much bigger than the figure has room for. It is standard in patent drawings to indicate the truncation by drawing the edge as a contour. FIG. 8A is discussed in col. 34, lines 25 – 53. There is no mention of the contour or any recess or raising of the metal facing, and no discussion of impressing a design in concrete. Such a discussion would be ridiculous, because FIG. 8A and the discussion thereof relates to a trailer panel, not a concrete panel. In this case, it is abundantly clear that the disclosure of the instant application appears to have caused the Examiner to see something in Sobolev that is not there. This is clearly hindsight and is not proper. MPEP §2142.

XII. THE REJECTION OF THE EXAMINER TO THE CLAIM OF GROUP IX

The Examiner's Rejection Of Claim 18 Under 35 U.S.C. §103 Under 35 U.S.C. §103(a) Over Sobolev In View Of Fitzgerald And Further In View Of Toedter Fails For All The Reasons Given In Section IV Above, And Also Because Toedter Does Not Disclose A Flange.

Claim 18 depends on claim 1 and includes all its limitations; therefore, this claim is patentable for all the reasons given in Section IV above in connection to claim 1.

Claim 18 recites a double-thick flange made by bending the end of the panel twice. The Examiner cites Toedter to obviate the flange. Toedter does show a decorative panel that includes a folding process similar to the folding process by which the flange of the present invention is made. However, the process is not used to make a flange, but to construct the body of the panel itself. There is nothing in Toedter that would suggest making a flange. The only suggestion to use the process of Toedter for a flange comes from the present disclosure. The Examiner is again permitting the present disclosure to guide him in finding flange prior art, in the overall structure of an entire panel, which panel does not include a flange. This is hindsight.

XIII. THE REJECTION OF THE EXAMINER TO THE CLAIM OF GROUP X

A. The Examiner's Rejection Of Claim 39 Under 35 U.S.C. §103 Under 35 U.S.C. §103(a) Over Sobolev Does Not Meet The Legal Standard Required For A Prima Facie Case Of Obviousness Under §103 Because A Key Limitation Of Claim 39 Is Not Disclosed In Sobolev.

Claim 39 reads as follows:

> A concrete formwork panel comprising:
> a foam plastic core;
> a metal facing layer attached to said plastic core;
> a metal backing layer attached to said plastic core;
> wherein said foam plastic is 32% or more gas, by volume.

The limitation of a foam plastic core in which the foam plastic is 32% or more is not disclosed in Sobolev. As discussed above, the highest gas content of any foam plastic

disclosed in Sobolev is about 27%. The Examiner appears to take the position that because the rejection is a §103 rejection rather than a §102 rejection, the cited art does not need to include all the limitations of the claim. While it is true that for a §102 rejection all the elements must be found either expressly or inherently in a claim, this does not mean that for a §103 rejection limitations can be inserted based on the Examiner's opinion. Each limitation still must be found in a reference; it is just that the limitation can be from a second prior art reference. The prior art reference must teach or suggest all of the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991); MPEP 2142, and MPEP 2143 – 2143.03. "It is error to ignore specific limitations distinguishing over the references." *In re Glass*, 176 USPQ 489, 491 (CAPA 1973). See also *In re Saether*, 181 USPQ 36, 39 (CCPA 1974) at headnote 1, and *Ex parte Petersen*, 228 USPQ 217, 218 (PO Bd Pat App & Inter 1985) at headnote 1.

B. The Examiner's Rejection Of Claim 39 Under 35 U.S.C. §103 Under 35 U.S.C. §103(a) Over Sobolev Does Not Meet The Legal Standard Required For A Prima Facie Case Of Obviousness Under §103 Because The Sobolev Teaches Against The Claim, And Motivation For The High Gas Content Of The Foam Comes From The Instant Application, Not Sobolev.

The Examiner admits that Sobolev does contain an explicit teaching of 32% or more gas by volume, but tries to find the suggestion for it by picking bits and pieces of Sobolev relating to microballoons, not foam, and arguing that it would have been obvious to vary the size of the microballoon filler and thus gas per volume and to experiment with different foaming agents. The problem is that Sobolev itself discloses experimentation with different gas per volumes and different foaming agents and found them wanting. The Examiner ignores the teachings of Sobolev that foaming agents are problematic at a gas volume of 27%, and that even the microballoons are problematic at volumes of about 30%. The claimed gas volume of 32% is well above the highest foamed gas volume of 27% disclosed in Sobolev. Further, Sobolev teaches that at the foamed plastic gas volume of 27%, the impact resistance of the panel is already becoming problematic. Therefore, someone skilled in the art would not think it useful to go to values higher than 27%. The law requires that the prior art be considered in its entirety, and portions of the disclosures that teach

away from the claims not be ignored. MPEP 2141.02, last section and *Gore*, supra, pages 311 – 313.

C. The Office Actions Do Not Establish A Prima Facie Case Of Obviousness Of Claim 39 Under 35 U.S.C. §103(a) Because Sobolev Provides No Reasonable Expectation Of Success If The Claimed Panel Is Made.

The MPEP and the law also state that a basic requirement for a prima facie case of obviousness is that the prior art must provide a reasonable expectation of success. MPEP 2142 and MPEP 2143 – 2143.03. Here, the prior art teaches that one is likely to experience reduced impact resistance and process control difficulties with foam gas densities as high as 27%. It also suggests that important laminate properties may be lost at these gas volumes. Thus, the prior art does not provide a reasonable expectation of success for the claimed panel.

D. Any Prima Facie Case Of Obviousness Of Claim 39 Is Rebutted By The Unexpectedly Improved Properties Of The Claimed Panel.

We have discussed the unexpectedly improved deflection resistance of the panels according to the invention in detail above, so it is not necessary to repeat it here. The declarations relating to the unexpected results expressly point to claim 39 as covering the tested panels and to the unexpectedness of the results as coming from the high gas volume. (Rahe Dec., ¶¶9, 11, and 15.) As discussed more fully above, while we strongly believe that no prima facie case of obviousness has been shown for claim 39, we also think that if one has, it has been rebutted by the evidence of unexpected results.

XIV. THE REJECTION OF THE EXAMINER TO THE CLAIM OF GROUP XI

The Examiner's Rejection Of Claim 40 Under 35 U.S.C. §103 Under 35 U.S.C. §103(a) Over Sobolev Fails For All The Reasons Given In Section XIII Above, And Also Because The Foam Gas Volume Of 40% Is Almost 50% Higher Than The Highest Gas Volume Density Disclosed In Sobolev.

Claim 40 depends on claim 39 and contains all its limitations, and therefore is patentable for all the reasons given in Section XIII above. *In re Fine*, 5 USPQ 2d 1596,

1600 (Fed. Cir. 1988) at headnote 4. In addition, claim 40 recites the limitation that the plastic foam contains 40% or more gas by volume. There is no disclosure of any foam gas density as high as 40% in Sobolev. The highest gas density for foamed plastic disclosed in Sobolev is about 27%. Forty percent gas density is nearly 50% higher than this. Moreover, Sobolev discloses that gas volumes of 27% were problematic for foamed plastic. See col. 22, line 67 – col. 23, line 8. Even for microballoons, gas volumes higher than 30% were problematic. See col. 22, line 67 – col. 21, line 9, and Table IVa. If core densities of 40% are not mentioned in the references, they cannot be obvious. *In re Glass*, supra. Further, if core density reductions in the 27% range for foamed cores are problematic, it certainly is not obvious to make larger core density reductions. *In re Fine*, supra, 1599, near bottom of first column. Also see *W.L. Gore & associates v. Garlock, Inc.*, 721 F.2d 1540, 1550, 220 USPQ 303, 311, which is cited in *Fine*. Moreover, the MPEP specifically adapts the position of *Fine* and *Gore* on this issue. See MPEP 2141.02, last section.

XV. THE REJECTION OF THE EXAMINER TO THE CLAIM OF GROUP XII

The Examiner's Rejection Of Claim 41 Under 35 U.S.C. §103 Under 35 U.S.C. §103(a) Over Sobolev Fails For All The Reasons Given In Section XIII Above, And Also Because The Volume Of Gas Disclosed In Claim 41 Is Double The Highest Gas Volume For Foamed Plastic Disclosed In The Cited References, And Gas Volumes Far Smaller Are Disclosed As Being Problematic.

Claim 41 depends on claim 39 and contains all its limitations, and therefore is patentable for the reasons given in Section XIII above. *In re Fine*, 5 USPQ 2d 1596, 1600 (Fed. Cir. 1988) at headnote 4. In addition, claim 41 recites the limitation that the polyethylene foam contains 50% or more gas by volume. As indicated above, the highest gas density for foamed plastic disclose in Sobolev is about 27%, and even this is problematic. There is no disclosure of any foam gas density as high as 50% in Sobolev. If gas volumes of 50% are not mentioned in the reference, they cannot be obvious. *In re Glass*, supra. Further, if core density reductions of 27% for foam are problematic, and core density reductions of 30% are problematic for important laminate properties, even for microballoons, it certainly is not obvious to make 50% core density reductions which are

nearly 100% higher than the highest foam core density reduction disclosed in the reference.

XVI. THE REJECTION OF THE EXAMINER TO THE CLAIM OF GROUP XIII

The Examiner's Rejection Of Claim 42 Under 35 U.S.C. §103 Under 35 U.S.C. §103(a) Over Sobolev In View Of Fitzgerald Fails For All The Reasons Given In Section XIII Above, And Also Because There Is No Suggestion In Sobolev Or Fitzgerald To Combine The References.

Claim 42 depends on claim 39 and contains all its limitations, and therefore is patentable for the reasons given in Section XIII above. *In re Fine*, 5 USPQ 2d 1596, 1600 (Fed. Cir. 1988) at headnote 4.

Sobolev discloses a metal/resin/metal laminate panel. In one line at the end of a long list of possible uses, the reference states it can be used as a concrete formwork panel. Fitzgerald discloses a concrete mold. Those skilled in the art recognize that a concrete mold is a different product than a concrete formwork panel. (Rahe Supp. Dec., ¶¶17 – 20.) Molds are throw-away products, generally intended for one-time use. Fitzgerald supports this in that throughout the specification the molds are referred to as useful for forming *concrete test specimens*. See col. 1, lines 6 and 7, for example. Concrete formwork panels are intended to be assembled, used, disassembled, and reused for years and thus have to take a lot of abuse. (Rahe Supp. Dec., ¶¶17 – 20.) For this reason alone, one skilled in the art would not combine the two references.

Further, Fitzgerald is not about what kinds of plastics can be used for concrete molds. The entire disclosure is about a particular structure for a concrete mold. The entire disclosure of Fitzgerald regarding high-density polyethylene is as follows:

> Although not intended to limit the disclosure to any one particular plastic, one example of a suitable plastic is high-density polyethylene. (Col. 3, lines 13 – 15.)

Thus, the disclosure does not single out high-density polyethylene as having any particular advantages over other plastics for a mold, much less a laminated panel. It specifically does not teach anything about high-density polyethylene that would make it particularly useful in metal/plastic laminate, such as how it would laminate with metal and how the

laminate would stand up to abuse. (Rahe Supp. Dec., ¶21.) Sobolev mentions five different types of polymer resins that may be useful for forming the panel, but does not mention high-density polyethylene, polyethylene of any type, or anything else that would suggest that high-density polyethylene might be a suitable plastic to include in its laminate. Thus, there is nothing in the two disclosures that would suggest to one skilled in the art that a plastic mentioned only briefly in Fitzgerald in a way that did not suggest any properties that made it different from other plastics should be combined with the panel of Sobolev.

Finally, those skilled in the art know that plastics are not all equivalent. Finding the right plastic for a particular application is a sophisticated process. Most people, and certainly those skilled in the art, know that high-density polyethylene is the substance from which plastic milk jugs are formed, while the polymer resins of Sobolev are similar to plastic adhesives, such as superglue. The materials are sufficiently different that knowledge generally available to those skilled in the art would tend to point away from the substitution of one for the other, rather than the other way around.

XVII. THE OBJECTION OF THE EXAMINER TO THE CLAIM OF GROUP XIV

The Objection of the Examiner that claim 43 should be rewritten in independent form including all the limitations of the base claim and any intervening claim should not be sustained, as claim 43 depends on claim 19 which is patentable for the reasons given above in Section IVF.

XVIII. CONCLUSION

It is respectfully submitted that one reason why this case is before the Board is because the Examiner may never have considered the evidence of unexpected results in the manner required by law. As discussed above, the Examiner has continually dismissed this evidence because it did not fit the Examiner's apparent misinterpretation and misapplication of a phrase intended to apply to claims that cover a range. Moreover, to the extent the Examiner did consider the evidence, he only considered it after repeating his prior rejections. See all of the Office Actions after the first Office Action, in all of which the

discussion of the declarations comes only after the Examiner repeats the prior rejections. This is not proper. As stated in the MPEP:

> When an applicant timely submits evidence traversing a rejection, the examiner must reconsider the patentability of the claimed invention. The ultimate determination of patentability must be based on consideration of the entire record.... (citations). Facts established by rebuttal evidence must be evaluated along with the facts on which the conclusion of a *prima facie* case was reached, not against the conclusion itself. (citation). In other words, each piece of rebuttal evidence should not be evaluated for its ability to knock down the prima facie case. All the competent rebuttal evidence taken as a whole should be weighed against the evidence supporting the prima facie case. (citation).

MPEP 716.01(d).

The Board can also take judicial notice of the fact that there are literally hundreds of patent references on laminated panels and metal/plastic laminates in particular. Sobolev cites more than a score of such references. Yet, after six Office Actions, the Examiner continues to cite only a mold patent to reject the high-density polyethylene laminated panel claims and only a patent that teaches against high gas volumes in foam plastic laminates to reject the claims that relate to high gas volumes. Thus, the history of this prosecution is itself strong evidence that the claimed invention is patentable, particularly when the superior results are weighed into the analysis before the rejection is made.

For the above reasons, we submit that the rejections of the Examiner should be reversed and claims 1 – 12, 14 – 20, 22 – 28, and 39 – 42 should be allowed and the objection to claim 43 be withdrawn. Appellant thanks the Board for its thoughtful consideration of this appeal.

Respectfully submitted,
PATTON BOGGS LLP

Date: 6/24/05

By: _____
Carl A. Forest, Reg. No. 28,494
Telephone: (303) 894-6114
Facsimile: (303) 894-9239

Customer No.: 24283

9.) APPENDIX

CLAIM LISTING

1. (Previously presented) A concrete formwork panel comprising:

a high-density polyethylene plastic core;

a steel facing layer attached to said plastic core;

a metal backing layer attached to said plastic core;

said panel being thicker than 7 millimeters (mm).

2. (Original) A concrete formwork panel as in claim 1 wherein said panel ranges from 9 mm to 15 mm thick.

3. (Original) A concrete formwork panel as in claim 1 wherein said panel is 12 mm thick.

4. (Previously presented) A concrete formwork panel as in claim 1 wherein said panel has a density such that a panel that is 8 feet (2.43 meters) by 2 feet (0.6 meters) weighs 77 pounds or less.

5. (Previously presented) A concrete formwork panel as in claim 1 wherein said metal backing layer is steel.

6. (Previously presented) A concrete formwork panel as in claim 1 wherein one of said steel facing layer and said metal backing layer is made of 0.009 inch (0.23 mm) steel.

7. (Previously presented) A concrete formwork panel as in claim 1 wherein one of said steel facing layer and said metal backing layer is made of 0.013 inch (0.33 mm) steel.

8. (Previously presented) A concrete formwork panel as in claim 1 wherein one of said steel facing layer and said metal backing layer is made of 0.019 inch (0.48 mm) steel.

9. (Previously presented) A concrete formwork panel as in claim 1 wherein said metal backing layer is aluminum.

10. (Original) A concrete formwork panel as in claim 1 wherein said plastic is foam plastic.

11. (Previously presented) A concrete formwork panel as in claim 10 wherein said foam plastic is 40% or more gas, by volume.

12. (Previously presented) A concrete formwork panel as in claim 10 wherein said foam plastic is 50% or more gas, by volume.

Claim 13 (Canceled)

14. (Original) A concrete formwork panel as in claim 1 wherein said panel is bent to form a flange.

15. (Original) A concrete formwork panel as in claim 14 wherein said flange has openings formed in it.

16. (Original) A concrete formwork panel as in claim 14 wherein said panel is notched at said bend.

17. (Original) A concrete formwork panel as in claim 16 wherein said bend is a 90° bend.

18. (Previously presented) A concrete formwork panel as in claim 14 wherein said panel includes a panel end, said panel is bent twice to form a first bend and a second bend, said second bend being made closer, measured along the length of said panel, to said panel end than said first bend, said second bend being substantially 180° so that said panel is bent back on itself to form a double-thick flange comprising a first portion of said panel extending from said first bend to said second bend and a second portion of said panel extending from said second bend to said panel end.

19. (Original) A concrete formwork panel as in claim 1 wherein said panel is bent into a hollow columnar form.

20. (Original) A concrete formwork panel as in claim 19 wherein said columnar form is cylindrical.

Claim 21 (Canceled)

22. (Previously presented) A concrete formwork panel as in claim 1 wherein said facing has a recessed or raised portion forming a design to be impressed in concrete.

23. (Original) A concrete formwork panel as in claim 1 and further including a strengthening rib attached to said metal backing layer.

24. (Previously presented) A concrete formwork panel as in claim 23 wherein said strengthening rib includes a handhold portion adapted to be graspable by a human hand.

25. (Original) A concrete formwork panel as in claim 1 wherein said facing and said backing are attached to said plastic with adhesive.

26. (Original) A concrete formwork system comprising a plurality of concrete formwork panels as in claim 1 and a plurality of fasteners fastening said plurality of panels together.

27. (Original) A concrete formwork system as in claim 26 and further comprising a support framework adjacent said backing.

28. (Original) A concrete formwork system as in claim 27 wherein said framework comprises steel frame members.

Claims 29 – 38 (Canceled)

39. (Previously presented) A concrete formwork panel comprising:

a foam plastic core;

a metal facing layer attached to said plastic core;

a metal backing layer attached to said plastic core;

wherein said foam plastic is 32% or more gas, by volume.

40. (Previously presented) A concrete formwork panel as in claim 39 wherein said foam plastic is 40% or more gas, by volume.

41. (Previously presented) A concrete formwork panel as in claim 39 wherein said foam plastic is 50% or more gas, by volume.

42. (Previously presented) A concrete formwork panel as in claim 39 wherein said plastic is high-density polyethylene.

43. (Previously presented) A concrete formwork panel as in claim 19 wherein said panel has a first end and a second end, and wherein a first portion of said facing and a first portion of said plastic core are removed at said first end to expose a first surface of a first portion of said backing, which first surface was adjacent to said removed first plastic core portion prior to said removal of said first plastic core portion; a second portion of said facing is removed at said first end to expose a second surface of a second portion of said

plastic core, which second surface was adjacent to said removed second portion of said facing prior to said removal of said second portion of said facing; a second portion of said backing and a third portion of said plastic core are removed at said second end to expose a third surface of a third portion of said facing, which third surface was adjacent to said removed third plastic core portion prior to said removal of said third plastic core portion; a third portion of said backing is removed at said second end to expose a fourth surface of a fourth portion of said plastic core, which fourth surface was adjacent to said removed third portion of said backing prior to said removal of said third portion of said backing; and said first and second ends are joined with said plastic core abutting at its ends, said second surface in contact with said third surface, and said first surface in contact with said fourth surface.

A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application Serial No.: 09/993,733	
Filing Date: November 21, 2001	Group Art Unit: 1772
For: Concrete Formworks And Method Of Making Same	Examiner: Augehenbaugh, Walter
Inventor: Gregory D. Johnson	Docket No: 13190.101
	Attachment to Paper No.: 6

DECLARATION OF EDWARD RAHE

1. I, Edward Rahe, am currently Vice-President of Engineering for Symons Corporation. Symons is the leading manufacturer of concrete formworks and shoring in the United States. (See Exhibit A attached to this Declaration, which is a copy of the Symons home page on the Internet.) I am a Professional Engineer and have worked in the area of concrete formworks for thirty-eight years. All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true.

2. I have read and am familiar with the claims currently in the application, and I have read and am familiar with United States Patent No. 5,030,488 issued July 9, 1991 to Igor Sobolev (hereinafter "Sobolev"), and United States Patent No. 4,842,241 issued June 27, 1989 to John M. Fitzgerald et al. (hereinafter "Fitzgerald et al."),

3. I submit this Declaration to present to the examiner facts concerning the patentability of the claims in the application, including bringing to the attention of the examiner, in an authenticated manner, information relating to the patentability of the claims.

4. Claim 1 of the patent application describes a concrete formwork panel including a high-density polyethylene plastic core and a steel facing.

5. I note that neither Sobolev nor Fitzgerald et al. suggest such a combination, for concrete formwork or any other purpose.

6. At column 9, lines 27 – 30, Sobolev mentions steel as one of many metals

EXHIBIT A

that could be used to make a laminate panel. There is no suggestion at all that steel is any better than any other metal.

7. Sobolev is a very lengthy patent, but as far as I can tell the only other place that it mentions steel is at column 19, line 50 in connection with a failed example; that is, the only example in which steel was used failed because the core cracked under an impact test. It appears that all the successful examples in Sobolev use aluminum as a facing material.

8. From my own tests, the combination of steel facing with a high-density polyethylene core provides a concrete formwork panel that is vastly superior to all previous concrete formwork panels. Someone experienced in this field would never guess this from Sobolev, Fitzgerald et al., or their combination.

9. As part of my work, I have tested scores of different concrete formwork panels. My tests are quantitative and documented by a huge amount of records; however these records are proprietary to Symons and, in a sense, the life blood of our company. Therefore, I would prefer not to disclose them in detail. However, I can say that I have carefully studied the results of the tests, and the panel described by claims 1, 39 and other claims of the application (the Johnson panel) is the best I have ever found.

10. One example of a comparative test I put the Johnson panel through is shown in the attached Exhibit B. This compares the face sheet deflection at the centerline of bay supports at 12 inch center to center continuous over nine supports for a 3/8 inch Johnson panel, a new ½ inch HDO (high density overlay) panel, and a used ½ inch HDO panel. For concrete formworks this is the most important test since it shows how the panel will hold against the pressure of concrete. The Johnson panel is labeled "McCormick" since J. M. McCormick Co. is the company Mr. Johnson sells these panels through. As you can see a 3/8 inch Johnson panel is about 20% better than the ½ HDO panel and 43% better than a used ½ HDO panel. The ½ inch HDO panel is the most common concrete forming panel in use today.

11. The above results are surprising for a panel so thin and lightweight. They are even more surprising when you consider that the Johnson panel is about 85% plastic. It is very surprising that a metal/foamed plastic panel in which the plastic is over 30% gas gives

such good results.

12. The Johnson panel is also superior to all other panels I have tested in many other ways. For example, after a short time, other panels do not produce as smooth a concrete surface as the steel and high-density polyethylene combination.

13. Wood, for example, gets grooves, scratches, and other defects on its face that show up in the concrete surface, while aluminum facing is sensitive to the lye and other chemicals used in concrete and becomes marred after a short time, with the result that the concrete that is formed is no longer smooth.

14. The combination of steel facing with a high-density polyethylene core provides a concrete formwork panel that is lightweight and durable and at the same time provides an excellent finish.

15. I note that both Sobolev and Fitzgerald et al. are fifteen years old. If a concrete formwork panel made of steel and high-density polyethylene combination as described in claim 1 or a foamed metal-plastic panel with over 32% gas by volume as described in claim 39 are obvious in view of these references, why has no one made such a formwork panel before this, particularly since it is such an excellent formwork?

16. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 10-2-03 By: Edward C. Rahe P.E.
Edward Rahe, P.E.

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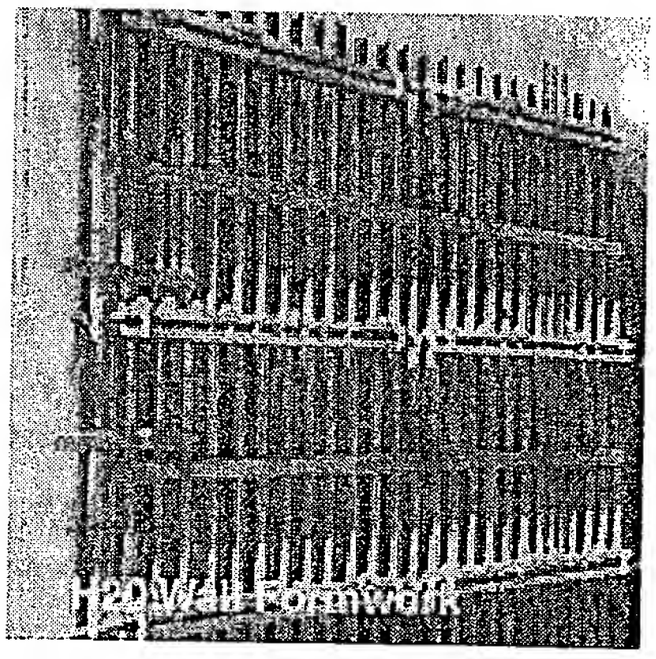

Agreements for the acquisition of Safway Formwork Systems, LLC, the forming and shoring division of Safway Services, Inc., have been signed by Dayton Superior Corporation.

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EXHIBIT A

9/24/2003

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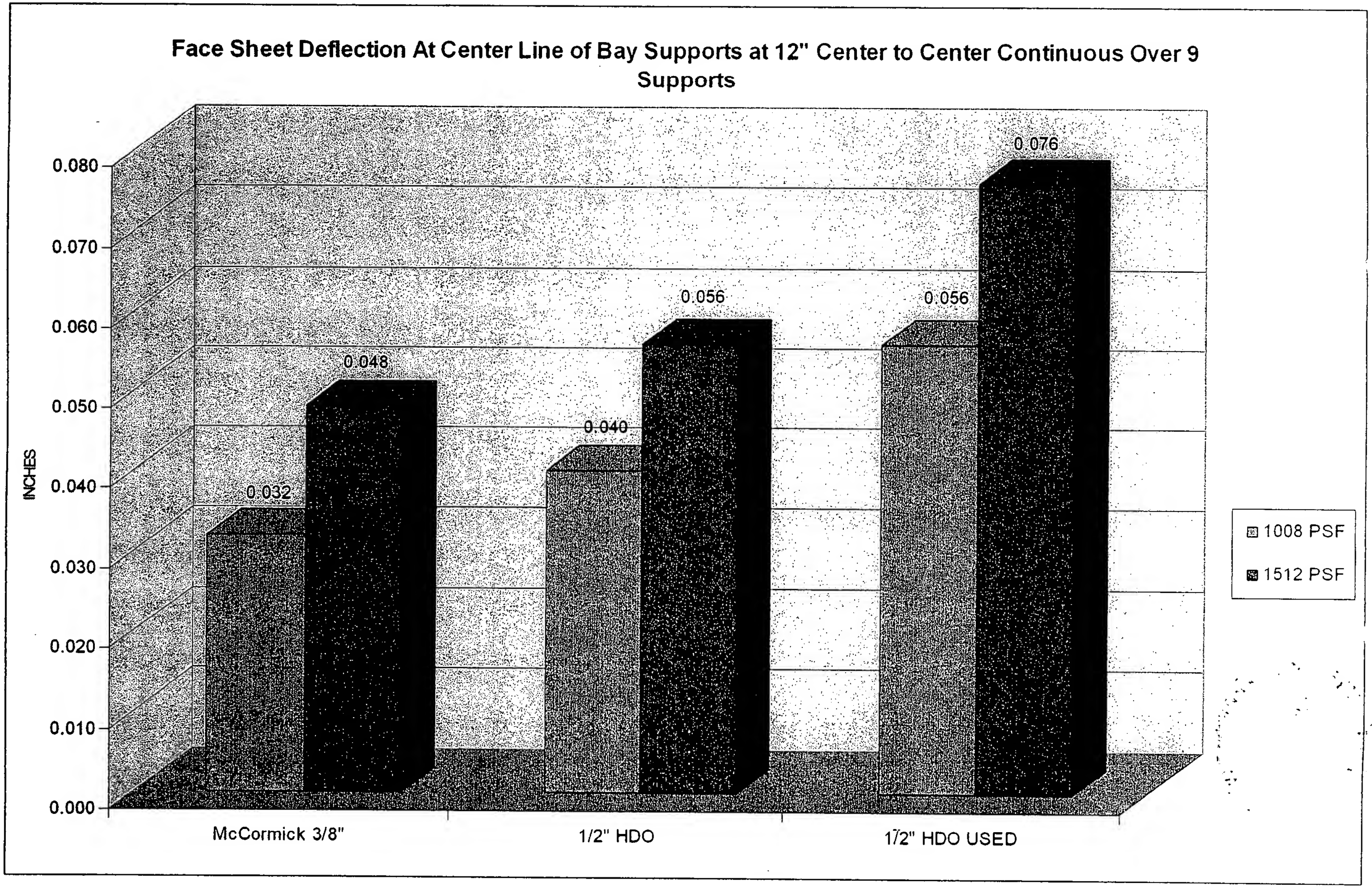

Face Sheet Deflection At Center Line of Bay Supports at 12" Center to Center Continuous Over 9 Supports
INCHES
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
0.048
0.032
0.056
0.040
0.056
0.076
McCormick 3/8"
1/2" HDO
1/2" HDO USED
1008 PSF
1512 PSF

EXHIBIT B

B

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application Serial No.: 09/993,733	Group Art Unit: 1772
Filing Date: November 21, 2001	Examiner: Augehenbaugh, Walter
For: Concrete Formworks And Method Of Making Same	Docket No: 13190.101
Inventor: Gregory D. Johnson	Attachment to Paper No.: 12

SUPPLEMENTAL DECLARATION OF EDWARD RAHE

1. I, Edward Rahe, am currently Vice-President of Engineering for Symons Corporation. Symons is the leading manufacturer of concrete formworks and shoring in the United States. I am a Professional Engineer and have worked in the area of concrete formworks for thirty-eight years. All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true.

2. I have read and am familiar with the claims currently in the application, and I have read and am familiar with United States Patent No. 5,030,488 issued July 9, 1991 to Igor Sobolev (hereinafter "Sobolev"), and United States Patent No. 4,842,241 issued June 27, 1989 to John M. Fitzgerald et al. (hereinafter "Fitzgerald et al."). I have also read the Advisory Action dated 10/23/2003 provided by the Examiner in this application.

3. I submit this Declaration to present to the Examiner facts concerning the patentability of the claims in the application, including bringing to the attention of the examiner, in an authenticated manner, information relating to the patentability of the claims.

4. I incorporate by reference the Declaration of Edward Rahe submitted earlier in this patent application.

5. The Examiner states in the Advisory action that the patent according to the claimed invention, i.e., "the McCormick Panel" was not compared to "the closest prior art commensurate in scope to the claims".

EXHIBIT B

6. I am not sure what the Examiner means by the above statement, but I thought I did compare it to the closest prior art panel, i.e., the panel it is will replace, namely, the HDO panels which are the most common concrete forming panels on the market today.

7. However, perhaps the Examiner means that I need to compare it to a concrete forming panel made of a metal/plastic laminate.

8. I attach as Exhibit C a summary of the deflection test performed on ten of the best panels I have tested in the last three years, arranged in descending order of how they performed, which is ascending order of deflection. The metal/plastic laminate panel is designated "German '1/2'". The other panels, except for the McCormick panel, are wood laminates or wood/epoxy laminates.

9. The German ½ panel is a half-inch thick laminate of aluminum and plastic. The plastic is a hard epoxy-type plastic, not high-density polyethylene, though I do not know the exact type of epoxy because the company that provided the panel did not disclose this to me . It is the best metal/plastic laminate panel I have ever tested prior to the McCormick panel.

10. All other metal/plastic panels I have ever tested were two to three times worse with respect to the deflection test. If there were another metal/plastic laminate panel that could be used as a concrete formwork panel out there, I would have seen it – That's the nature of my job. Thus, I consider the German ½ panel as the closest prior art to the McCormick panel.

11. For example, I recently tested a metal/plastic laminate panel that tested at 0.090 for the 1008 PSF test and 0.120 for the 1512 PSF test. I have not included this panel in the graph because it does not come close to the best panels.

12. As you can see from the graph, all the previous best panels are in a range of about 0.032 to 0.036 for the 1008 PSF test and 0.048 to 0.052 for the 1512 PSF test.

13. As you can also see from the graph, the McCormick *3/8 inch panel* tested about 10% better than the German *½ inch panel.*

14. Mr. Forest tells me that the approximately 10% difference between the two

may not seem like much to someone not familiar with the concrete formwork art. However, to me, this is a big difference. All the really good panels I test regularly are within a few percent of each other. So 10% is a significant difference to one skilled in the art of concrete formwork panels.

15. A more appropriate comparison is between the McCormick ½ inch panel and the German ½ inch panel. As you can see, the McCormick ½ inch panel gives more than 25% better results.

16. To me, a 25% difference is really amazing. For years I have tested panels, none of which have gotten much below 0.033 inches for the 1008PSF test and 0.050 inches for the 1512 PSF test. To suddenly find one that gets down to 0.028 inches and 0.038 inches, respectively, is quite shocking.

17. I should also note that people regularly bring me solid plastic panels, like the one in the Fitzgerald et al. patent, for testing. All of these are way off scale with respect to deflection. They invariably pillow under the field tests. Solid plastic panels like the Fitzgerald et al. panel could be considered only as throw-away panels, at the very best. Fitzgerald suggests this when he states in column 1, line 7 that the are used for forming test specimens.

18. To one skilled in the art of concrete formworks, the term "formwork panel" refers only to panels that can be connected to other panels to make a formwork, and then disassembled and used again in another formwork that usually is completely different.

19. To one skilled in the art of concrete formworks, the Fitzgerald et al. device is a mold, not a formwork.

20. Concrete formwork panels have to take a lot of abuse. The environments in which they are used are brutal. One skilled in the art would not read Fitzgerald et al. and Sobolev and come to the conclusion that high-density polyethylene could be laminated with steel to make a quality concrete formwork panel.

21. For one thing, Fitzgerald does not teach anything about how polyethylene would laminate to steel and how the steel/plastic laminate will stand up to abuse. For another thing, my experience with plastic and plastic laminate panels is that few of them

hold up to the deflection criteria, and thus to assume that a particular plastic will work in combination with a particular metal or wood is pure speculation.

22. I noted in my previous Declaration that the core of the steel/plastic laminate in Sobolev cracked under the impact test. The Examiner argues that because a panel that was made with aluminum and a "slightly more flexible epoxy resin mixture" did not crack, that one skilled in the art would reason that if a steel panel were made with the "slightly more flexible epoxy resin mixture" it would work. I do not agree for the reason given above.

23. I would assume from Sobolev that he did not include the steel laminate with the "slightly more flexible epoxy resin mixture" because it did not work.

24. The Examiner also minimizes the significance of "slight cracking" under an impact test. It is in the nature of concrete formworks to be subjected to impacts. If something cracks, even slightly, one skilled in concrete formworks would not use it.

25. The Examiner also argues that one skilled in the art would be motivated by Sobolev "to determine the optimal value of gas by volume". I do not agree.

26. First of all, at column 22, lines 13 – 15, Sobolev states: "In a number of cases, core density reductions of 30% were readily achieved without loss of important laminate properties."

27. The above statement suggests, that core density reductions of greater than 30% do result in loss of important laminate properties. In fact, because the statement is preceded by the phrase "in some cases", this tells me that in the majority of cases, core density reductions of 30% resulted in loss of lamination properties.

28. Further, delamination is very serious in concrete formwork panels. Concrete formwork panels are expected to last for years if used every day, and up to 5 years if not used regularly, and delamination problems often do not show up until well after sale.

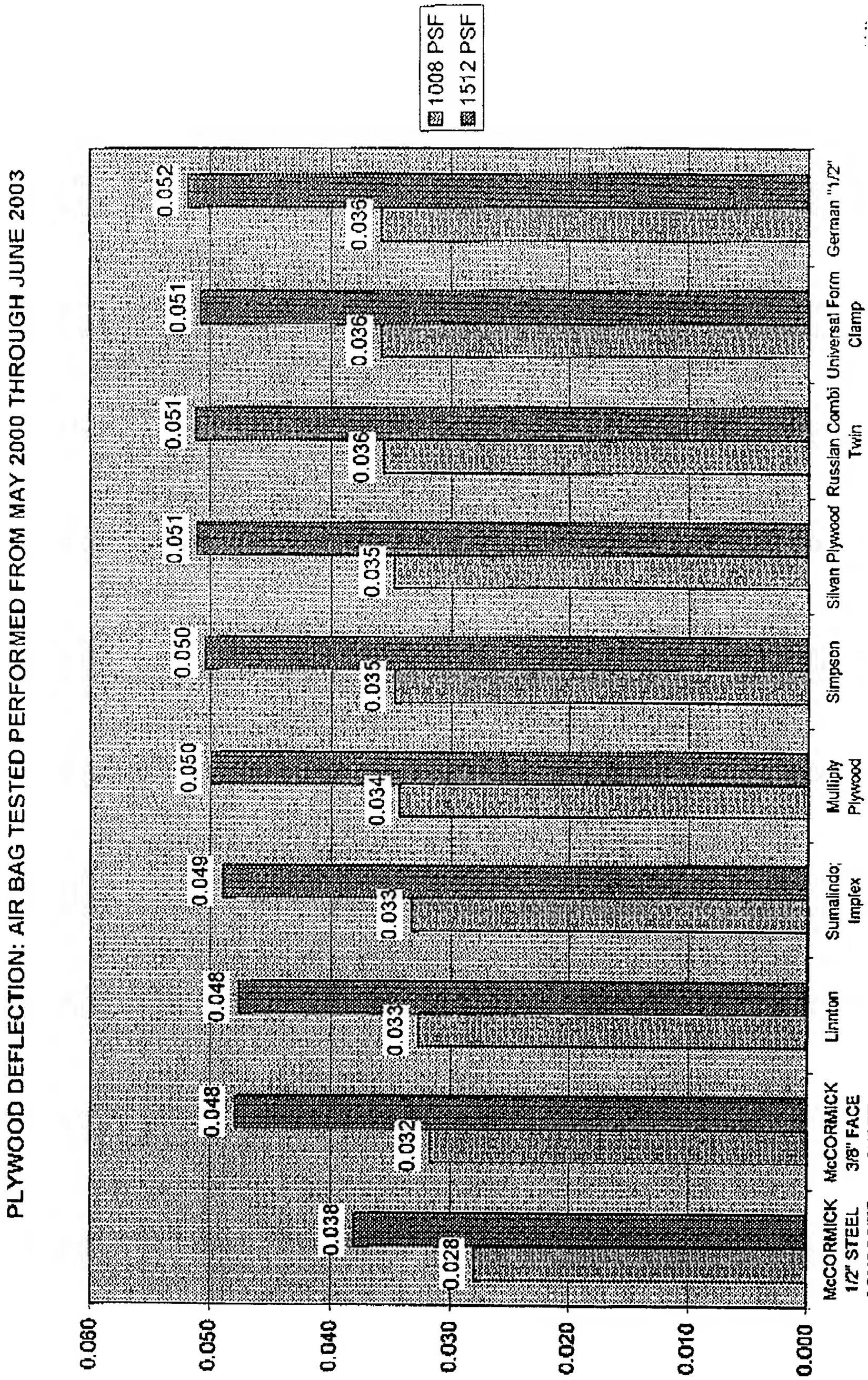
29. Delamination problems almost always result in returns, which are costly, and sometimes loss of a sale. Thus, before adopting a panel with a density reduction different than that disclosed in Sobolev, a prudent person skilled in the art would make a panel, test it over a period of at least months, make another panel, etc. If Sobolev can be believed,

some of these would delaminate or crack, and then new panels would have to be made, followed by new tests. Thus, in a commercial concrete formwork environment, it would take years to experiment as the Examiner suggests to determine an optimum value of gas by volume. However, more likely, one skilled in the art would not even bother to perform such experiments, for the reasons given above.

30. In summary, based on Sobolev, one skilled in the art would avoid core density reductions of greater than 30%.

31. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: February 2, 2004 By: Edward Rahe P.E.
Edward Rahe, P.E.



TOTAL P.02

EXHIBIT C

C

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application Serial No.: 09/993,733	Group Art Unit: 1772
Filing Date: November 21, 2001	Examiner: Augehenbaugh, Walter
For: Concrete Formworks And Method Of Making Same	Docket No: 013190.0101PTUS (Formerly 13190.101)
Inventor: Gregory D. Johnson	Confirmation No.: 9460
	Attachment to Paper No.: 17

SECOND DECLARATION OF GREGORY D. JOHNSON

1. I, Gregory D. Johnson, am currently a Partner in J. M. McCormick Company, a distributor of lumber and other building products. I have worked in the area of lumber and building materials for eighteen years, and in particular, I have distributed and sold lumber and laminated panels for use in buildings, construction, truck bodies, and other uses for most of these eighteen years. All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true.

2. I am the inventor in the above-designated patent application (hereinafter "the application").

3. I have read and am familiar with the claims currently in the application and the Office Action dated August 4, 2004 issued by the Examiner in the application (hereinafter "the Office Action") and the declarations of Edward Rahe filed earlier in this application. I have also read and am familiar with United States Patent No. 5,030,488 issued July 9, 1991 to Igor Sobolev (hereinafter "Sobolev").

4. I submit this Declaration to present to the Examiner facts concerning the patentability of the claims in the application, including bringing to the attention of the Examiner, in an authenticated manner, information relating to the patentability of the claims.

5. I am familiar with the concrete formwork industry, particular their specification

EXHIBIT C

needs and tests of panels, having sold plywood into this industry for over fifteen years. I am also familiar with the trucking panel industry, particular their specification needs and tests of panels, having sold various types of wood into that industry for more than five years.

6. The concrete formwork industry is slow to make changes. The people who use concrete formwork like to stick with what they know.

7. About 2.5 years ago, I submitted for testing to Symons Corporation, the largest supplier of concrete formwork panels in the United States, samples of concrete formwork panels as described in at least the present claims 1 – 5, 10 – 19, and 40 – 43.

8. Symons Corporation tested these panels in the lab and then in the field for two years and found that they met or exceeded all their requirements.

9. I have now sent Symons, at their request, 900 additional panels as described in at least the present claims 1 – 5, 10 – 19, and 40 – 43.

10. Symons will perform an in-depth test of these panels on site at customer locations in Chicago and other cities. This test involves day-to-day tracking and recording of the performance of the panels. These tests are expensive; therefore, Symons would not undertake them unless the company had strong reason to believe that the panels will become a successful product.

11. Symons is also considering the panel as described in at least present claims 1 – 5, 10 – 19, and 40 – 43 as a replacement for aluminum concrete panel face plates.

12. Gates and Sons, Incorporated in Denver has also tested the panel with good results. Both Symons and Gates are taking the panel to the World of Concrete show in January to present and sell it.

13. The deflection tests disclosed in Sobolev are tests that are "three-point tests" useful for the trucking panel industry. As disclosed in Sobolev, in these tests, a panel piece is held at two ends and a weight is suspended at the middle. This measures how much a panel will deflect if, for example, a person or a box leans against it.

14. The deflection tests in the concrete industry are different. Concrete creates a pressure across the entire panel; thus, the tests run on formwork panels in the concrete

industry measure the deflection when a certain pressure is exerted across the entire panel.

15. Thus, the results of the tests described in Sobolev and the tests for concrete formwork panels as describe by Mr. Rahe in his declaration are not directly comparable.

16. In the Supplemental Declaration of Edward Rahe, Mr. Rahe states that a 10% difference in deflection is a concrete formwork panel is significant. The reason this is so is because the pour rate in the concrete industry is determined by panel deflection.

17. That is, when concrete is poured into a form, the amount of deflection is proportional to how fast the concrete enters the form. Thus, a 10% lower deflection allows one to pour the concrete about 10% faster, a 25% lower deflection allows the concrete to be poured about 25% faster, and a 30% lower deflection allows the concrete to be poured about 30% faster, etc.

18. An easy way to make a panel have less deflection, is to make it thicker. However, this also makes it heavier, and there are strong constraints on how heavy a concrete formwork panel can be, because panels that are too heavy require expensive machinery to install, and require much more time to install.

19. Time is money in the concrete industry, and the savings in time as a result of lower deflection in a panel that meets the weight constraints, flows money directly to the bottom line. Thus, significantly less deflection means significantly more profits.

20. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 11/4/2004 By: _____
Gregory D. Johnson

b

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application Serial No.: 09/993,733	Group Art Unit: 1772
Filing Date: November 21, 2001	Examiner: Aughenbaugh, Walter
For: Concrete Formworks And Method Of Making Same	Docket No.: 013190.0101PTUS (Formerly 13190.101)
Inventor: Gregory D. Johnson	Confirmation No.: 9460
	Attachment to Paper No.: 17

SECOND DECLARATION OF CARL A. FOREST

1. I, Carl A. Forest, am currently a Partner in Patton Boggs, LLP and am the attorney prosecuting the above-identified application. All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true.

2. I have read and am familiar with the claims currently in the application and the Office Action dated August 4, 2004 issued by the Examiner in the application (hereinafter "the Office Action").

3. I submit this Declaration to present to the Examiner facts concerning the patentability of the claims in the application, including bringing to the attention of the Examiner, in an authenticated manner, information relating to the patentability of the claims.

4. On page 14 of the Office Action, the Examiner states that steel is a much stiffer metal than aluminum, so it would not be unexpected that a steel/HDPE/metal laminate panel deflects less than and aluminum/epoxy-type plastic laminate panel. This is true if the panels are otherwise equivalent in the amount of metal used.

5. However, steel also is much more dense than aluminum. In fact, steel is about 2.9 times as dense as aluminum, and has a Young's modulus (the measure of stiffness) of about 2.7 to 3 times that of aluminum. See the Tables 10.1 and 12.1 from University Physics, Sears and Zemansky, Addison-Wesley Publishing, 1957, a copy of

which is attached. So, weight for weight, aluminum is about as stiff as steel, and perhaps a little stiffer.

6. Laminated panels are usually made so they are close to a standard weight for whatever industry for which the panel is used. Generally, to reach the standard weight, an aluminum panel would include more metal than a steel panel. This is the case in Sobolev, cited by the Examiner.

7. Shortly after receiving the Office Action, I contacted Mr. Edward Rahe, who had submitted the previous two declarations, to find out how the weight of the "German" panel compared to the weight of the "McCormick" panel.

8. Mr. Rahe informed me that Symons had thrown away the "German" panel, and it was no longer being made in a ½-inch thickness by the German company, which he informed me was Alkus. He searched his records and found some literature on the Alkus panels, but they did not give the weight or density. Thus, he did not know the weight of the German panel.

10. I have searched the Alkus Internet site at http://www. alkus.de and found that Mr. Rahe is correct. Though they make panels thicker than the "German" panel, they no longer appear to make a ½-inch (12 mm) panel. Further, densities and weights of panels were not given.

11. Further, I have emailed Alkus and asked them for the weights of the panels they do make, but received no answer.

12. Not having been able to determine a weight or density through Alkus, I tried to contact Mr. Rahe again to see if he might be able to provide any further information that might be relevant.

13. However, Mr. Rahe had had a reoccurrence of a stomach cancer and is currently in the hospital, so I have not pressed him further.

14. The Sobolev reference does contain some relevant information that pertains to this issue.

15. In Table II spanning columns 19 and 20, Sobolev compares steel and aluminum panels of about the same weight. The steel panel tested is about 5% heavier than the aluminum panel, but deflects about 20% more. See column 13, lines 42 – 56, for

an explanation of these tests.

16. The steel panel was also about 30% worse than the aluminum panel for impact resistance.

17. Mr. Rahe states in paragraph 14 of his Supplemental Declaration that a 10% difference in deflection is a significant difference in the concrete formworks industry. Thus, it is fair to say that Sobolev shows that the steel panel is significantly inferior to the aluminum panel.

18. The "German" ½-inch panel and the McCormick ⅜-inch panel have essentially the same ratio of thicknesses as the aluminum and steel panels tested and reported on in Table II of Sobolev, probably because there are weight constraints that are necessary to fit into. Thus, it should be expected that they would test about the same, and the steel panel would be about 20% to 30% worse than the aluminum.

19. However, the ⅜-inch McCormick panel tested by Mr. Rahe was 10% better than the "German" panel. See Supplemental Declaration of Edward Rahe, paragraph 13.

20. Thus, the McCormick panel is at least 30% better than one would expect based on Sobolev. Mr. Rahe has suggested under oath that such a result would be "amazing" to one skilled in the art of concrete formwork panels. See Supplemental Declaration of Edward Rahe, paragraph 16.

21. In the Office Action, the Examiner insists that the only valid comparison is a comparison of the panels according to the invention with the panels of Sobolev.

22. I have searched the Internet and reference books in the Boulder Public Library and the University of Colorado to try to find any panel made by Chemical and Polymer Technology, Inc., any firm in Orinda, California, or any panel associated with the name Igor Sobolev, with the intention of buying such a panel and testing it. My search came up dry, except for the Sobolev patent cited by the Examiner and an earlier unrelated Sobolev patent. Apparently, no such panels are made.

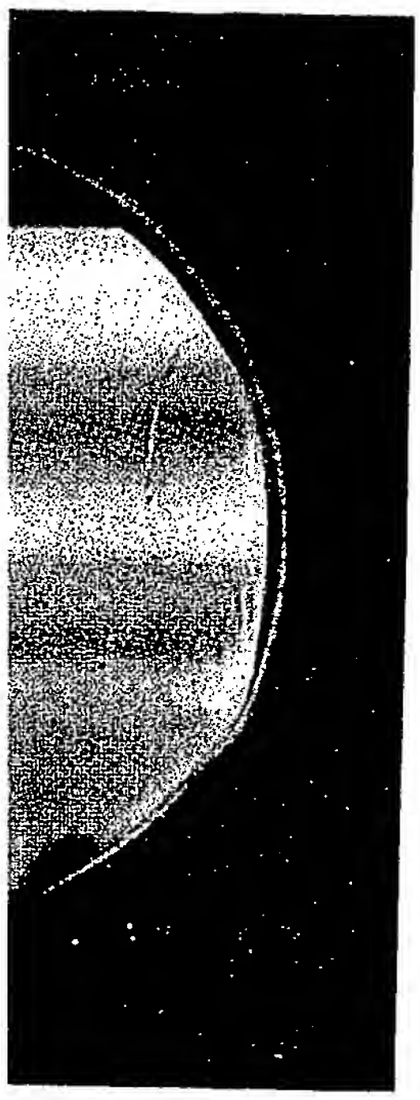
23. Further, based on the declarations of Edward Rahe, it is doubtful that any such panels were ever used in the concrete industry. See Supplemental Declaration of Edward Rahe, paragraph 10.

24. I hereby declare that all statements made herein of my own knowledge are

true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 11/04/04 By: _____

Carl A. Forest



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Massachusetts Institute of Technology

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The City College of New York

SECOND EDITION

with Supplementary Problems

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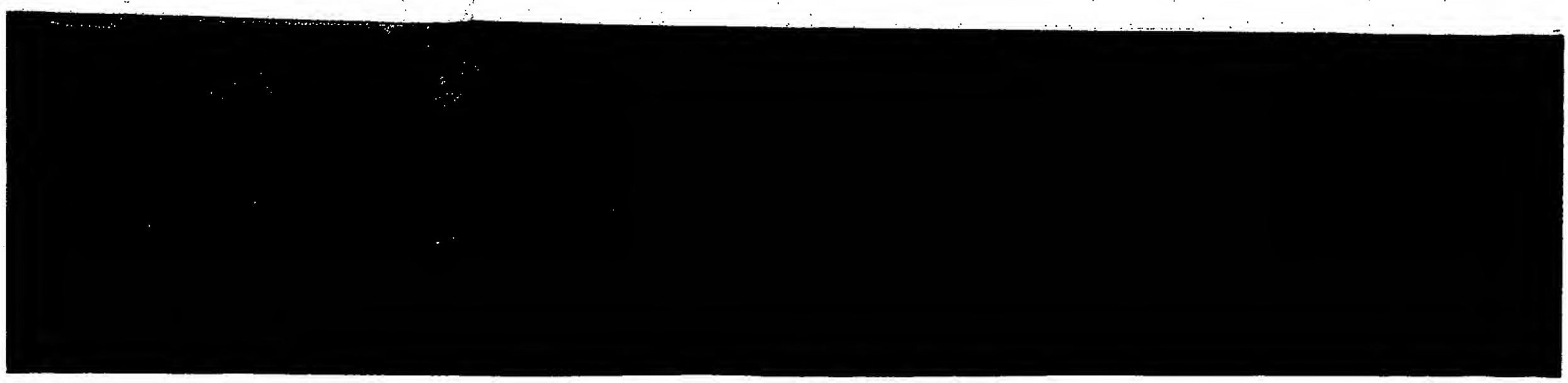

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TABLE 10–1. ELASTIC CONSTANTS
(Representative values)

Material	Young's modulus		Shear modulus		Bulk modulus	
	dynes/cm² (× 10^{11})	lb/in² (× 10^6)	dynes/cm² (× 10^{11})	lb/in² (× 10^6)	dynes/cm² (× 10^{11})	lb/in² (× 10^6)
Aluminum	7	10	2.4	3.4	7	10
Brass	9	13	3.5	5.1	6.1	8.5
Copper	10–12	14–18	4	6	12	17
Iron, cast	8–10	12–14			9.6	14
Iron, wrought	18–20	26–29			15	21
Lead	1.5	2.3	0.5	0.8	0.8	1.1
Steel	19–21	27–30	8	12	16	23

$$E = \frac{\text{shearing stress}}{\text{shearing strain}} = \frac{F_t/A}{\phi}. \tag{10–8}$$

(Refer to Fig. 10–6 for the meaning of ϕ.) The shear modulus of a material is also expressed as force per unit area. For most materials it is one-half to one-third as great as Young's modulus.

The modulus relating an increase in hydrostatic pressure to the corresponding decrease in volume is called the *bulk modulus* and we shall represent it by B.

$$B = -\frac{p}{\Delta V/V_0}. \tag{10–9}$$

The minus sign is included in the definition of B since an increase of pressure always causes a decrease in volume. That is, if p is positive ΔV is negative. By including a minus sign in its definition the bulk modulus itself is a positive quantity.

The reciprocal of the bulk modulus is called the *compressibility*, k. Tables of physical constants often list the compressibility rather than the bulk modulus. From its definition,

$$k = \frac{1}{B} = -\frac{1}{p}\frac{\Delta V}{V_0}, \tag{10–10}$$

$$\Delta V = -kV_0p. \tag{10–11}$$

The ratio $\Delta V/V_0$ is the fractional change in volume. Hence the compressibility of a substance may be defined as its fractional change in volume per unit increase in pressure.

TABLE 10

Lic
Carbon disulpl
Ethyl alcohol.
Glycerine.
Mercury.
Water.

The units of a bulk m
of pressure, and the units
of a reciprocal pressure.
often expressed in atmosp
sponding units of compre
or atm^{-1}. For example,
(see Table 10–2) is 50 ×
that the volume decrease
each atmosphere increase

Table 10–3 shows the
strain, and elastic moduli

When a metal rod is s
is found to change as in
to A, is a straight line.
between stress and strai
stress is not carried bey
returns to its original len
the portion of the curve

TAB

Type of stress	Stre
Tension	$\frac{F_n}{A}$
Compression	$\frac{F_n}{A}$
Shear	$\frac{F_t}{A}$
Hydrostatic pressure	p (=

CHAPTER 12

HYDROSTATICS

12–1 Introduction. The term "hydrostatics" is applied to the study of fluids at rest, and "hydrodynamics" to fluids in motion. The special branch of hydrodynamics relating to the flow of gases and of air in particular is called "aerodynamics."

A fluid is a substance which can flow. Hence the term includes both liquids and gases. Liquids and gases differ markedly in their compressibilities; a gas is easily compressed, while a liquid is practically incompressible. The small volume changes of a liquid under pressure can usually be neglected in this part of the subject.

The density of a homogeneous material is defined as its mass per unit volume. Densities are therefore expressed in grams per cubic centimeter, kilograms per cubic meter, or slugs per cubic foot. We shall represent density by the greek letter ρ (rho).

$$\rho = \frac{m}{V}, \quad m = \rho V. \tag{12–1}$$

For example, the weight of 1 cubic foot of water is 62.5 lb; its density is $62.5/32.2 = 1.94$ slugs per cubic foot.

TABLE 12–1. DENSITIES

Material	Density (gm/cm³)
Aluminum	2.7
Brass	8.6
Copper	8.9
Gold	19.3
Ice	0.92
Iron	7.8
Lead	11.3
Platinum	21.4
Silver	10.5
Steel	7.8
Mercury	13.6
Ethyl alcohol	0.81
Benzene	0.90
Glycerin	1.26
Water	1.00

The *specific gravity* of a
water and is therefore a
ingly poor term, since it h
sity" would describe the c

12–2 Pressure in a flui
was introduced in Section
the pressure was assumed
however, that atmospheric
that the pressure in a lak
tance from the bottom.
and define the pressure *at*
exerted on a small area *d*

$$p$$

If the pressure is the s
area A, these equations red

Let us find the general
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have an area A. If ρ is the
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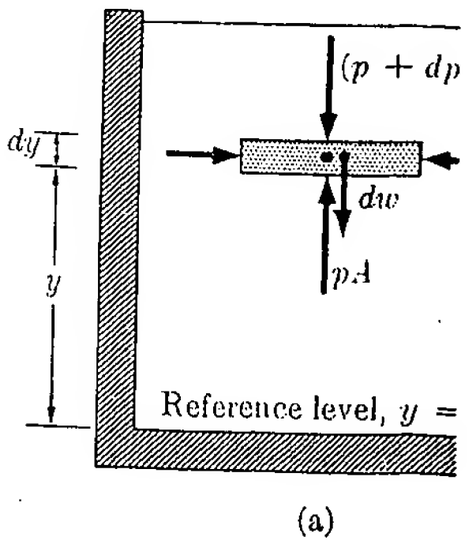
metry, the resultant horizor



(a)

Fig. 12–1. Force

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EXHIBIT E

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flam·y (flā′mē) *adj.* **-ier, -iest.** Flamelike; flaming.

flan (flăn, flän) *n.* 1. A tart with a filling of custard, fruit, or cheese. 2. A molded custard with a burnt-caramel icing. 3. A metal disk to be stamped as a coin; a blank. [French, from Old French *fla(o)n*, from Germanic. See **plat-** in Appendix.*]

Flan·ders (flăn′dərz). *Flemish* **Vlaan·de·ren** (vlän′də-rən); *French* **Flan·dre** (fläN′dr'). 1. A region of northwestern Europe, including part of northern France and western Belgium, and bordered by the North Sea. 2. The area of Belgium comprising the provinces of **East Flanders** and **West Flanders** *(both of which see)*.

flâ·ne·rie (flän-rē′) *n. French.* Aimless idling; dawdling.

flâ·neur (flä-nœr′) *n. French.* An aimless idler; a loafer.

flange (flănj) *n.* A protruding rim, edge, rib, or collar, as on a wheel or a pipe shaft, used to strengthen an object, hold it in place, or attach it to another object. —*tr.v.* **flanged, flanging, flanges.** To furnish with a flange. [Probably variant of earlier *flanch*†.]

flank (flăngk) *n.* 1. The section of flesh between the last rib and the hip; side. 2. A cut of meat from this section of an animal. 3. A side or lateral part: *the flank of a mountain.* 4. **a.** The right or left side of a military formation: *attack on both flanks.* **b.** The right or left side of a bastion. —*v.* **flanked, flanking, flanks.** —*tr.* 1. To protect or guard the flank of. 2. To menace, attack, or maneuver around the flank of. 3. To be placed or situated at the flank or side of. —*intr.* 1. To be at or move along a side. 2. To be adjacent; border. Used with *on* or *upon*. [Middle English *fla(u)nke*, from Old French *flanc*, from Frankish *hlanca* (unattested), side. See **kleng-** in Appendix.*]

flank·er (flăng′kər) *n.* 1. One that flanks. 2. A division of soldiers guarding the flank of a marching column. 3. A fortification attached to the side or flank of. 4. A flankerback.

flank·er·back (flăng′kər-băk′) *n. Football.* The halfback of the offensive team stationed just behind the line of scrimmage and to the right of his team's right end.

flan·nel (flăn′əl) *n.* 1. A soft woven cloth of wool or of a blend of wool and cotton or synthetics. 2. Canton flannel; flannelette. 3. *Plural.* Outer clothing, especially trousers, made of flannel. 4. *Plural.* Underclothing made of flannel. —*tr.v.* **flanneled** or **-nelled, -neling** or **-nelling, -nels.** 1. To rub or polish with flannel. 2. To wrap in flannel. [Middle English, probably from *flanen*, sackcloth, from Welsh *gwlanen*, "woolen cloth," from *gwlān*, wool. See **wel-**⁶ in Appendix.*] —**flan′nel·ly** *adj.*

flannel bush. A shrub or small tree, *Fremontia californica*, of California and northern Mexico, having downy, lobed leaves and showy yellow flowers.

flannel cake. A **pancake** *(see)*.

flan·nel·ette, flan·nel·et (flăn′ə-lĕt′) *n.* A cotton cloth, **Canton flannel** *(see)*.

flan·nel-leaf (flăn′əl-lēf′) *n.* A species of **mullein** *(see)*.

flap (flăp) *v.* **flapped, flapping, flaps.** —*tr.* 1. To wave (wings or arms) up and down; to beat. 2. To cause to wave or undulate; agitate. 3. To hit with something broad and flat; to slap. 4. *Informal.* To fling down or clap shut. —*intr.* 1. To wave about while fixed at one edge or corner to something stationary; to flutter. 2. To wave arms or wings up and down; beat the air. 3. To fly by beating the air with the wings. —*n.* 1. A flat appendage or lappet usually intended to double over and protect or cover something, as on an envelope, pocket, or hat. 2. The action of waving or fluttering; flapping. 3. The sound of flapping. 4. A blow given with something flat; a slap. 5. *Aviation.* A variable control surface on the trailing edge of an aircraft wing, used primarily to increase lift or drag. 6. *Surgery.* Tissue that has been partially detached and used in plastic surgery to fill an adjacent defect or to cover the cut end of a bone after amputation. 7. *Slang.* A condition of agitated distress; pother; flurry. [Middle English *flappen*. See **plab-** in Appendix.*]

flap·doo·dle (flăp′dōōd′l) *n. Slang.* Foolish talk; balderdash; nonsense. [Origin obscure.]

flap·jack (flăp′jăk′) *n.* A **pancake** *(see)*. [FLAP (to toss) + JACK (name)].

flap·pable (flăp′ə-bəl) *adj. Slang.* Easily excited or upset.

flap·per (flăp′ər) *n.* 1. One that flaps. 2. A flipper or similar flexible part. 3. *Informal.* A young woman, especially one who flaunts her disdain for conventional dress and behavior, chiefly during the 1920's.

flare (flâr) **flared, flaring, flares.** —*intr.* 1. To flame up with a wavering light; blaze unsteadily. 2. To burst into intense but short-lived flame. Often used with *up*. 3. To erupt into sudden emotion or activity. Often used with *out* or *up*. 4. To spread outward in shape or configuration, as a skirt, or the lip of a bell or vase. —*tr.* 1. To cause (something) to flare. 2. To signal with flares. —*n.* 1. A brief, wavering blaze of light. 2. A signaling device that produces a bright light for signaling, illumination, or identification. 3. An outbreak, as of emotion or activity. 4. An expanding contour, as of the lip of a vase. 5. *Photography.* A lens reflection or the resultant film fogging. [Origin unknown.]

flare·back (flâr′băk′) *n.* 1. A flame produced in the breech of a gun by ignition of residual gases. 2. A burst of something that has its origin; backfire: *a flareback of publicity.*

flare-up (flâr′ŭp′) *n.* 1. A sudden outbreak of flame or light. 2. An outbreak or eruption: *a flare-up of anger.* 3. An intensification, as of something hitherto mild or dormant: *a flare-up of old wounds.*

flash (flăsh) **flashed, flashing, flashes.** —*intr.* 1. To occur or emerge suddenly in, or as if in, flame. 2. To appear or be perceived for an instant only. 3. To be lighted intermittently; sparkle; scintillate. 4. To move rapidly. —*tr.* 1. **a.** To cause (light) to appear suddenly or in intermittent bursts. **b.** To cause to burst into flame. **c.** To reflect (light). **d.** To reflect light from (a surface). 2. To expose to a flash or flashes of light. 3. To signal with light. 4. To communicate (information) at great speed. 5. To exhibit (something concealed) briefly. 6. To display ostentatiously; flaunt. 7. To fill suddenly with water. 8. To cover with a thin protective layer. —*n.* 1. A sudden, brief, intense display of light. 2. A brief, unexpected, splendid display, as of a quality or mental faculty: *a flash of insight.* 3. A split second; an instant: *in a flash.* 4. A brief, important news dispatch or transmission. 5. *Informal.* The language or cant of thieves, tramps, or underworld figures. 6. A flashlight. 7. **a.** Instantaneous illumination for photography. **b.** Any equipment or device, as a flash bulb, flash gun, or flash lamp, used to produce such illumination. —See Synonyms at **blaze, moment.** —**flash in the pan.** 1. An explosion of the gunpowder in the pan of a flintlock rifle that does not set off the charge. 2. One that promises great success but fails. —*adj.* 1. Happening suddenly or very quickly: *a flash flood.* 2. Pertaining to thieves, confidence men, and underworld figures. [Middle English *flashen*, to splash, burst into flame (imitative).]

Synonyms: *flash, gleam, glance, glint, sparkle, glitter, glisten, shimmer, glimmer, twinkle, spark, scintillate.* These verbs mean to send forth or reflect light. *Flash* refers to a sudden and brilliant but short-lived outburst of light. *Gleam* implies light of moderate brightness, either transient or constant and often appearing against a dark background. *Glance* refers most often to light reflected obliquely. *Glint* refers to emitted or reflected light in flashes. *Sparkle* suggests a rapid succession of flashes of high brilliance, and *glitter* a similar succession of even greater intensity. *Glisten* usually refers to lustrous, reflected light, and *shimmer* to the reflection of soft, undulating light. *Glimmer* is applied to emission or reflection of subdued, fleeting light. *Twinkle* refers to the intermittent emission of soft, wavering light, and *spark* to the production of brief flashes of light or fire. *Scintillate* is applied to what flashes as if throwing off sparks in a continuous stream.

flash back. To interrupt a story in order to portray or recount an incident or scene from the past; cut back.

flash·back (flăsh′băk′) *n.* A reversion to previously depicted events in a film narrative. Also called "cutback."

flash·board (flăsh′bôrd′, -bōrd′) *n.* Boarding that extends above a dam to increase the depth of water held.

flash bulb. A glass bulb filled with finely shredded aluminum or magnesium foil that is ignited by electricity to produce a short-duration high-intensity light flash for taking photographs. Also called "photoflash."

flash burn. A burn resulting from brief exposure to intense radiation.

flash card. One of a set or integrated series of cards used for brief, usually successive, display; especially, such a card used by a teacher in a drill.

flash·cube (flăsh′kyōōb′) *n.* A small cube that contains four flash bulbs and that rotates automatically when a picture is taken with a camera to which it is attached.

flash·er (flăsh′ər) *n.* 1. One that flashes. 2. A device that automatically switches an electric lamp off and on, as in a commercial display sign.

flash flood. A sudden, violent flood after a heavy rain.

flash gun. A dry-cell powered photographic apparatus that holds and electrically triggers a flash bulb.

flash·ing (flăsh′ing) *n.* 1. The act of producing a rush of water in a channel. 2. Sheet metal or weather stripping used to reinforce and weatherproof the joints and angles of a roof.

flash lamp. An electric lamp for producing a high-intensity light of very short duration for use in photography.

flash·light (flăsh′līt′) *n.* 1. A small, portable lamp consisting of a bulb and dry batteries encased usually in a metal and plastic cylinder. 2. A brief, brilliant flood of light from a photographic lamp. 3. A bright, flashing beam or light, as of a beacon or signal lamp.

flash·o·ver (flăsh′ō′vər) *n.* An unintended electric arc, as between two pieces of apparatus.

flash point. The lowest temperature at which the vapor of a combustible liquid can be made to ignite momentarily in air.

flash tube. A gas discharge tube used in an electronic flash to produce a brief, intense pulse of light.

flash unit. 1. An electronic flash system containing both power supply and flash tube in a single compact unit. 2. **a.** A flash gun. **b.** A flash gun and reflector.

flash·y (flăsh′ē) *adj.* **-ier, -iest.** 1. Giving a momentary or superficial impression of brilliance. 2. Cheap and showy; gaudy. —**flash′i-ly** *adv.* —**flash′i-ness** *n.*

flask (flăsk, fläsk) *n.* 1. A small bottle or other container with a narrow neck and usually a cap, especially: **a.** A container for liquor with a flat, slightly curved shape to fit in a person's pocket. **b.** A container or case for carrying gunpowder or shot. **c.** A vial or round long-necked bottle for laboratory use. 2. A frame for holding a sand mold in a foundry. [Old French *flasque, flaske*, from Late Latin *flascō, flasca*, probably from Germanic *flaska-* (unattested).]

flat¹ (flăt) *adj.* **flatter, flattest.** 1. Having no curves; of zero curvature. 2. Extending or lying completely in a plane; planar. 3. Having a smooth, even, level surface. 4. Not deep or high; shallow; low: *a flat box.* 5. Lying prone; prostrate. 6. Unequivocal; unqualified; absolute; downright: *a flat refusal.* 7. Fixed;